SITE: CRACKER ASPHALT
BREAK: 1.8
OTHER: Vol. 1

Tetra Tech EM Inc.

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Approved 9/21/00
Low priority
amg

September 15, 2000

Ms. Annie Godfrey, Remedial Project Manager
U.S. Environmental Protection Agency Region 4
Emergency Response and Removal Branch
61 Forsyth Street, SW, 11th Floor
Atlanta, Georgia 30303

Subject: **Contract No. 68-W5-0021 (START)**
Draft Reassessment Report
Cracker Asphalt
EPA ID No. AL0000472712
TDD No. 04-1501-0001

Dear Ms. Godfrey:

Enclosed is one copy of the draft reassessment report for the Cracker Asphalt site located in Moundville, Tuscaloosa County, Alabama. Also included are one copy of the confidential page and scoresheets.

If you have any questions or need additional copies of the report, please contact me at (617) 371-2444 extension 25

Sincerely,

Paul F. Moss

for J. Benjamin Latham
START Project Manager

cc: Debbie Davidson, Contract Officer (letter only)
Cindy Gurley, EPA Process Owner
Charles Swan, Project Officer
Steve Pierce, START Program Manager (letter only)
Joseph Baer, START Site Assessment Coordinator (letter only)
START File

DRAFT REASSESSMENT REPORT
CRACKER ASPHALT
MOUNDVILLE, TUSCALOOSA COUNTY, ALABAMA

EPA ID NO. AL0000472712

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 4
61 Forsyth Street, SW, 11th Floor
Atlanta, Georgia 30303

TDD No.	:	04-1501-0001
Date Prepared	:	September 15, 2000
Contract No.	:	68-W5-0021
Prepared by	:	Tetra Tech EM Inc.
START Project Manager	:	J. Benjamin Latham
Telephone No.	:	(617) 371-2444
EPA Task Monitor	:	Annie Godfrey
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Prepared By

Paul F. Mosier
for J. Benjamin Latham
START Project Manager

CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

This draft reassessment report has been prepared in accordance with the requirements of Technical Direction Document (TDD) No. 04-1501-0001, which the U.S. Environmental Protection Agency (EPA) Region 4 assigned to Tetra Tech EM Inc. Superfund Technical Assessment and Response Team (START). START was tasked to prepare a reassessment report for the Cracker Asphalt (Cracker) site in Moundville, Tuscaloosa County, Alabama. This reassessment report evaluates the observed and potential contamination at the site, presents the site setting and historical activities, and provides a recommendation regarding further action.

2.0 SITE BACKGROUND

The Cracker site is located at Cracker Road, Moundville, Tuscaloosa County, Alabama (EPA 2000). The geographic coordinates of the site are 33°00' 42" north latitude and 87°37' 22" west longitude (Figure 1) (USGS 1983; ADEM 1996, pg. 1). The property is bound to the north by uninhabited land including wetlands and the Black Warrior River; to the south by railroad tracks, residential land and agricultural land; to the east by a methane well dirt access road and uninhabited forested and swamp land; and to the west by the Lawter Chemical Plant and the Mound State Monument. The nearest residence is located approximately 400 feet south of the site. Property use in the general vicinity of the site is mixed residential, agricultural, commercial, and industrial (USGS 1983; ADEM 1996, pgs. 1-3).

For an unknown period of time ending in 1968, the Cracker property was owned by Cracker Asphalt Company and was used for asphalt refining and storage. Located on the property during the historic asphalt production use were 9 buildings, 24 aboveground storage tanks (AST) with a total capacity approximately of 350,000 gallons, and 3 surface impoundments with a total capacity approximately 300,000 cubic feet (Figure 2). In 1968, the property was sold to Mr. Paul Wesselhoeft for use in metal fabrication, which included metal tank cap and boat anchor production. Based on available file information, use of the ASTs and surface impoundments ceased following the sale of the property; however, one of the tanks was occasionally leased to Southeast Resins Company for the storage of petroleum solvents. To date, the tanks and impoundments have not been removed from the property (ADEM 1996, pgs. 3-4; ADEM 1994, pgs. 3-4).

During a visual inspection of the property on April 29, 1986 Alabama Department of Environmental Management (ADEM) personnel observed spillage from an on-site AST that was being leased to Southeast Resins Company. Subsequent to the ADEM inspection on May 6, 1986, ADEM issued a Notice of Violation (NOV) to Mr. Wesselhoeft stating that one of the former asphalt lagoons was contributing to groundwater contamination on the property. The NOV stated that Mr. Wesselhoeft was responsible for taking actions to address the contamination on the property (ADEM 1994, pg. 3).

On June 1, 1986, Mr. Wesselhoeft completed and submitted to ADEM a response to the NOV that included the completion of an environmental investigation of the area. However, on June 12, 1986, ADEM issued a letter stating that the response to the NOV did not address the groundwater contamination and that appropriate investigations of the property were still necessary. No further actions or investigations are known to have been completed by the property owner in response to the ADEM NOV. On September 25, 1986, the site was transferred to the Office of General Counsel for review due to the noncompliance of the property owner (ADEM 1994, pg. 3).

On January 12, 1994, approval was given to assess the site through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. A site discovery was completed for the property on July 21, 1994 (EPA 1994).

During September 1994, ADEM completed a preliminary assessment (PA) of the Cracker property. The PA report summarized the operational history of the property and identified potential receptors of contamination migrating from the property. Source areas described in the report included the various ASTs, lagoons, and holding areas that remained on the property after asphalt refining and storage ceased. Due to the lack of sampling data, the PA report recommended that further investigation of the property be conducted to characterize potential contamination (ADEM 1994, pgs 1-9).

A site investigation (SI) was completed for the Cracker property in 1996 to expand on the findings of the PA and further identify potential source areas on the property. As part of the SI, groundwater, surface soil, source soil, and seep samples were collected. Sample results indicated the presence of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) at levels exceeding

background levels on the property (ADEM 1996, pgs 8-15). Sampling results are summarized in the appropriate sections of this report.

3.0 PATHWAYS

3.1 GROUNDWATER MIGRATION PATHWAY

The Cracker property and the area surrounding the Cracker property lie within the Alluvial Deltaic Plain district of the East Coast Coastal Plain physiographic section. Physiographic features in the vicinity of the property consist of flat flood plains and terraces that have been formed by the Black Warrior River (ADEM 1996, pg. 4; DeJarnette 1987).

The geologic outcrops in the vicinity of Moundville consist of gravel, sand, silt, and clay (ADEM 1996, p. 3-4) and in areas are as thick as 100 feet. On the site, Quaternary age alluvium and terrace deposits overlie the Cretaceous age Gordo and Coker Formations of the Tuscaloosa Group. The Gordo Formation is generally not greater than 400-feet thick and consists of sand and gravel overlain by alternating lenticular beds of sand and mottled clay. Beneath the Gordo Formation, is the Coker Formation which ranges in thickness from less than 100 feet to up to 1,000 feet and consists of a non-marine gravel zone overlain by marine sand and clay. The sand and gravel beds of the Tuscaloosa group are the major sources of groundwater within 4 radial miles of the Cracker property (DeJarnette 1987; Davis 1975). No geologic formation located within 4 radial miles of the Cracker property exhibits karst characteristics (ADEM 1996).

The terrace deposits on the Cracker property consist of an upper fine-grained unit and a basal coarse-grained unit that lies on the Gordo Formation. The Gordo Formation on the property consists of an upper unit of sand intermingled with varying amounts of clay and clayey sand and is estimated to be between 35 to 120 feet thick beneath the property (ADEM 1996, pg. 6).

Available file information does not indicate the depth to groundwater or direction of groundwater flow on the property. Based on the topography of the area, groundwater flow likely follows the general direction of the topography and migrates radially from the property toward wetlands north of the

property, the Black Warrior River located west of the property, and the Carthage Branch located southwest of the property (USGS 1983).

Potential groundwater targets located within a 4-mile radius of the property consist of both private and public drinking water users within the town of Moundville. Two public drinking water source wells screened on the Gordo Aquifer and operated by the Moundville Water Works system are located within a 4-mile radius of the Cracker property. Water from the two wells (located 1.5 and 3.75 miles southwest and south of the property) is blended and distributed to the approximate 3,445 people on the Moundville system. In addition to supplying water for residents of Moundville, approximately 300,000 gallons of water are sold to the Hale County Water System. Hale County receives approximately 40 percent of its drinking water from the two wells located within a 4-mile radius of the Cracker property. Hale County, which serves approximately 8,033 people, blends the purchased water from Moundville with water obtained from drinking water sources located greater than 4 radial miles from the Cracker property (Tetra Tech 2000).

Five monitoring wells (CA-MW1 through CA-MW5) are located on the Cracker property. Additionally, 12 monitoring wells are located on the adjacent property west of the site (Lawton Chemical). Groundwater samples collected from the Cracker property in 1995 were analyzed for VOCs and SVOCs (ADEM 1996). Table 1 summarizes the contaminant concentrations detected in the groundwater samples (ADEM 1996, p. 7).

Based on the analysis of groundwater samples collected from the Cracker property during 1995 hazardous substances (primarily VOCs) have been released to the groundwater. The hazardous substances detected in groundwater samples have also been detected in on-site surface soil samples and are attributable to the historic use of the property.

3.2 SURFACE WATER PATHWAY

The Cracker property is located within the Black Warrior Drainage Basin at approximately 170 feet above mean sea level (amsl) and is located outside of the 100-year flood plain (USGS 1983; FEMA

Table 1

Contaminants Detected in Groundwater on the Cracker Asphalt Property
(Samples collected 1995)

Contaminant (μg/L)	Monitoring Well				
	CA-MW1	CA-MW2	CA-MW3	CA-MW4	CA-MW5
Benzene	139.9	37.5	--	--	--
Ethylbenzene	121.9	--	--	--	--
Naphthalene (VOC)	1,134.0	662.7	--	1.7	0.9
Naphthalene (BNA)	558.69	338.064	--	--	--
n-Propylbenzene	--	53.2	--	--	--
Toluene	13.2	7.5	--	--	--
1,2,4,-Trimethylbenzene	111.1	50.6	1.6	--	--
m+p Xylene	57.6	20.8	--	--	--
o-Xylene	--	88.0	--	--	--

μg/L = Micrograms per liter
VOC = Volatile organic compound
BNA = Base neutral analysis

1985). Surface water drainage from the property likely migrates radially toward wetlands associated with the Black Warrior River located approximately 1,000 feet northeast of the property, directly discharges to the Black Warrior River located approximately 500 feet northwest of the property, or discharges to the Carathage Branch located approximately 1,500 feet southwest of the property. All surface water originating on the Cracker property ultimately discharges to the Black Warrior River (USGS 1983).

The Carthage Branch is considered a minimal stream with an average annual flow rate of less than 10 cubic feet per second (cfs). The Black Warrior River is considered a moderate to large stream with an average annual flow rate of approximately 935 cfs (Moore 1991; ADEM 1996, pg. 10).

The 15 mile surface water pathway ends 1 mile downstream of the point where Buck Creek enters the Black Warrior River. Approximately 26 miles of wetlands frontage are located along the 15-mile surface water pathway (USGS 1983). Additionally, nine endangered and threatened species are known to inhabit portions of the Black Warrior River and could be impacted by a release of hazardous substances from the property (USFWS 1992).

No known surface water drinking water intakes are located along the 15-mile surface water pathway (ADEM 1996, pg. 10). No known commercial or recreational fishing occurs on the Carthage Branch; however, the Black Warrior River is considered a fishery (ADEM, pg. 11).

During the completion of the SI, groundwater seeps were observed along the erosional scarp adjacent to the Black Warrior River and along the banks of the Carthage Branch; the seeps migrated to the surface water. Water samples collected from the seeps were analyzed for VOCs. Seep samples collected along the banks of the Black Warrior River and the Carthage Branch indicated the following contaminants: xylene up to 320 micrograms per liter (μg/L), methylene chloride up to 7.5 μg/L, chloroform at 4.7 μg/L, benzene up to 150 μg/L, ehthylbenzene at 54 μg/L, toluene at 28 μg/L, chloroethane at 7.5 μg/L, benzene at 150 μg/L, 1,3-cytopentadiene at 3.9 μg/L, propyl benzene at 19 μg/L, and styrene at 37 μg/L (ADEM 1996, pg. 10). To date, no known surface water or sediment samples have been collected from within the surface water pathway.

3.3 SOIL EXPOSURE PATHWAY

The Cracker property is underlain by Bama Series soils, which were formed from loamy marine sediments of fine sandy loam, loam, and sandy clay loam. Soils of this series are considered to be deep, well drained, and moderately permeable (ADEM 1996, pg. 11).

The Black Warrior River and associated wetlands restrict access to the Cracker property from both the east and northeast; however, pedestrian access to the property from the south and west is not restricted (USGS 1983; ADEM 1996, pg. 11).

Based on past investigations of the property, approximately 20 people work on the Cracker property (ADEM 1996, pg. 12). The nearest residence is located approximately 400 feet south of the property (USGS 1983). Approximately 6 people (not including on-site workers) are located within 0.25 mile of the property, and approximately 108 people are located within 1 mile of the property (Tetra Tech 2000). Moundville Elementary School is located approximately 0.9 mile to the southwest of the site. No known daycare facilities are located within 0.5 mile of the property (ADEM 1996, pg. 12). No portion of the property is considered to be a wetland, and no know threatened or endangered species are know to inhabit the property (USGS 1983).

Areas of contaminated soil have been observed by ADEM in the vicinity of the ASTs. In November 1995 as part of the completion of the SI, six surface soil samples were collected from the property and analyzed for VOCs and SVOCs. Sampling locations were selected based on their proximity to source areas and areas likely to contain contaminants. The following substances were detected at elevated concentrations: toluene up to 2.0 micrograms per kilogram (mg/kg); 1,2,3 trimethylbenzene up to 0.33 mg/kg; 1,3,5 trimethylbenzene up 0.36 mg/kg; 1,2,4 trimethylbenzene up to 1.7 mg/kg; ethylbenzene up to 0.23 mg/kg; isopropylbenzene (up to 0.17 mg/kg; and naphthlene up to 48.3 mg/kg; n-propylbenzene up to 0.81 mg/kg (ADEM 1996, pg. 12).

3.4 AIR MIGRATION PATHWAY

The nearest residence is located approximately 400 feet south of the site (ADEM, pg. 12; USGS 1983). According to the U.S. Department of Commerce, Land View III Environmental Mapping Software, which is based on the Bureau of Census 1990 population data, the total population located within 4 miles of the property is as follows: 0 to 0.25 mile, 6 people; 0.25 to 0.5 mile, 25 people; 0.5 to 1 mile, 77 people; 1 to 2 miles, 306 people; 2 to 3 miles, 689 people; and 3 to 4 miles, 1,218 people (Tetra Tech 2000).

Based on published data from U.S Fish and Wildlife Service 10 threatened or endangered species are known to inhabit portions of Hale and Tuscalossa Counties and may occur within 4 miles of the site (USFWS 1992). Based on USGS topographic maps, approximately 9 acres of wetlands are located with

0.25 miles of the site, 370 acres are within 1 mile of the site, and approximately 1,900 acres are within 4 miles of the site (USGS 1983).

No air samples are known to have been collected at the Cracker property. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations or sensitive environments are known or suspected.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on available information, a release of contaminants at least partially attributable to the historic use of the property has occurred to the groundwater, surface water, and surface soils at the site; therefore, additional action under CERCLA is recommended at the Cracker site. Contaminated seeps have been observed to migrate to the surface water; however, to fully evaluated the impact on receptors from site-related contaminants, samples should be collected along the surface water pathway and analyzed for ? VOCs and SVOCs?.

Additionally, based on available file information, no groundwater or surface soil samples collected from the property have been analyzed for metals. Samples of soil and groundwater should be collected at the site and analyzed to determine if a threat of metals contamination exists.

REFERENCES CONSULTED

1. U.S. Environmental Protection Agency (EPA). Envirofacts - CERCLIS Query Results for Cracker Asphalt, AL0000472712. Based on data extracted from updated CERCLIS January 19, 2000.

2. U.S. Geological Survey, Alabama, 7.5-minute topographic maps (Fosters, Englewood, Moundville East, Moundville West). Scale 1;24,000. 1983

3. Alabama Department of Environmental Management (ADEM), Site Investigation. Cracker Asphalt. Tuscaloosa/Hale County, Alabama. Prepared for EPA. February 6, 1996.

4. ADEM, Preliminary Assessment for Cracker Asphalt. Tuscaloosa, Hale County, Alabama. Prepared for EPA. October 25, 1994.

5. DeJarnette, Sydney S., and Crownover, Jo E., "Geohydrilogy and Susceptibility if Major Aquifers to Surface Contamination in Alabama; Area 6." U.S. Geological Survey Water-resources Investigations Report 87-4113. 1987

6. Davis, Martin E., et al., Geological Survey of Alabama. "Water Availability and Geology of Hale County, Alabama, Map 136." 1975.

7. Federal Emergency Management Agency, Flood Insurance rate Maps, Hale and Tuscaloosa Counties; Moundville, Alabama. Panel Number 010096005B.

8. More, James D., et al, Geological Survey of Alabama, "Water in Alabama, 1990: Circular 122H." 1991.

9. Tetra Tech EM Inc. Project Note to File regarding population within distance rings for Cracker Asphalt, in Moundville, Alabama. Project number 0071-2-150101. April 18, 2000.

10. U.S. Environmental Protection Agency, Superfund Chemical Data Matrix (SCDM), Publication 9345.1-22. Published by the Office of Emergency and Remedial Response USEPA. June 1996.

11. Tetra Tech EM Inc. Project Note to File regarding the wetland acreage within distance rings for Cracker Asphalt, Moundville, Alabama. Project number 0071-2-150101. May 10, 2000.

12. U.S. Fish and Wildlife Service, "Endangered and Threatened Species of the Southeastern United States (The Red Book)." 1992.

13. U.S. Environmental Protection Agency, Site Discovery Form for entry to CERCLIS. January 12, 1992.

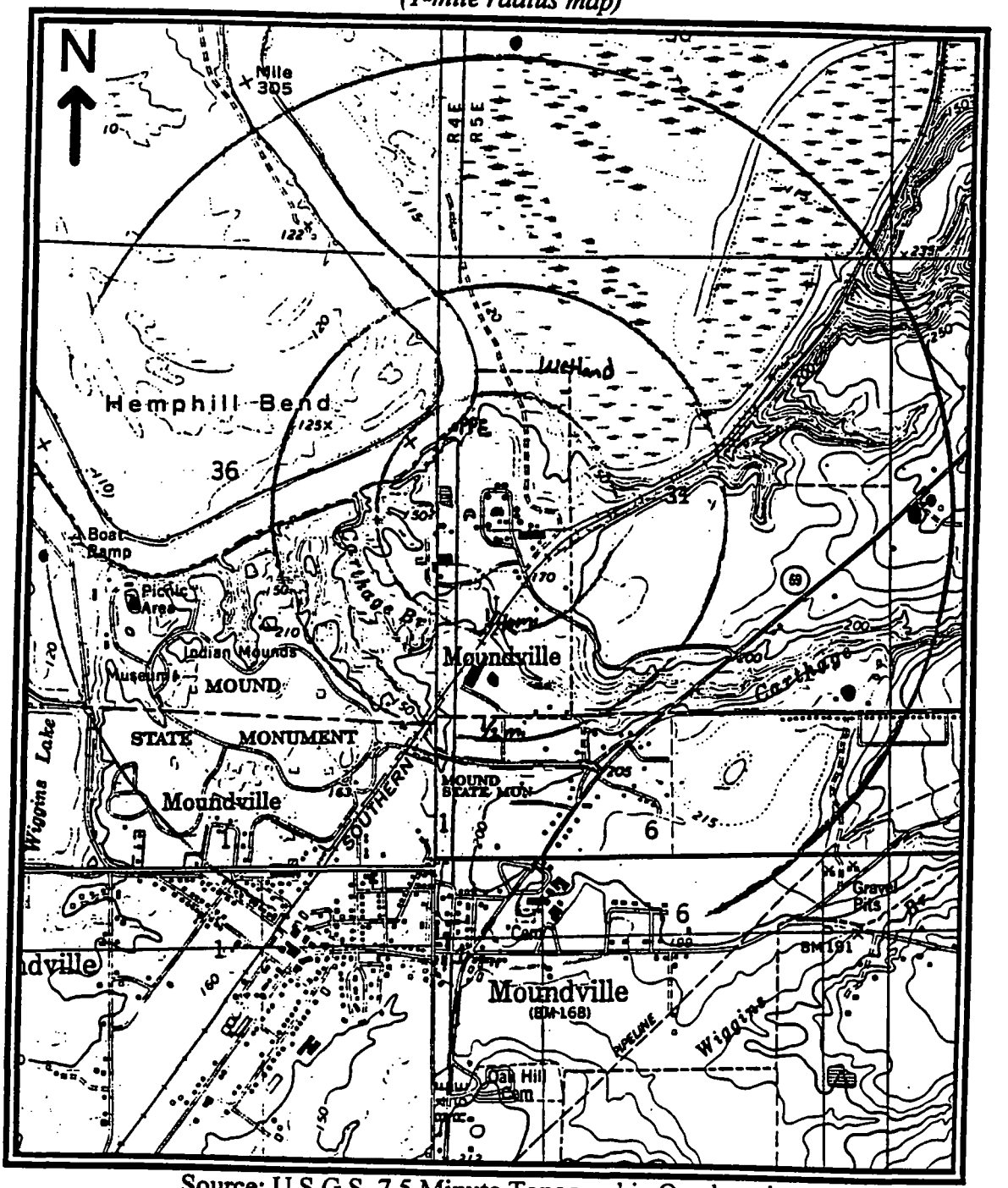
14. Tetra Tech EM Inc. Record of Telephone Conversation Concerning Water Supply for Moundville, AL. Between Ben Latham and Ms. Bonnie Bradshaw, Moundville City Water Department. July 20, 2000.

REFERENCES CONSULTED CONTINUED

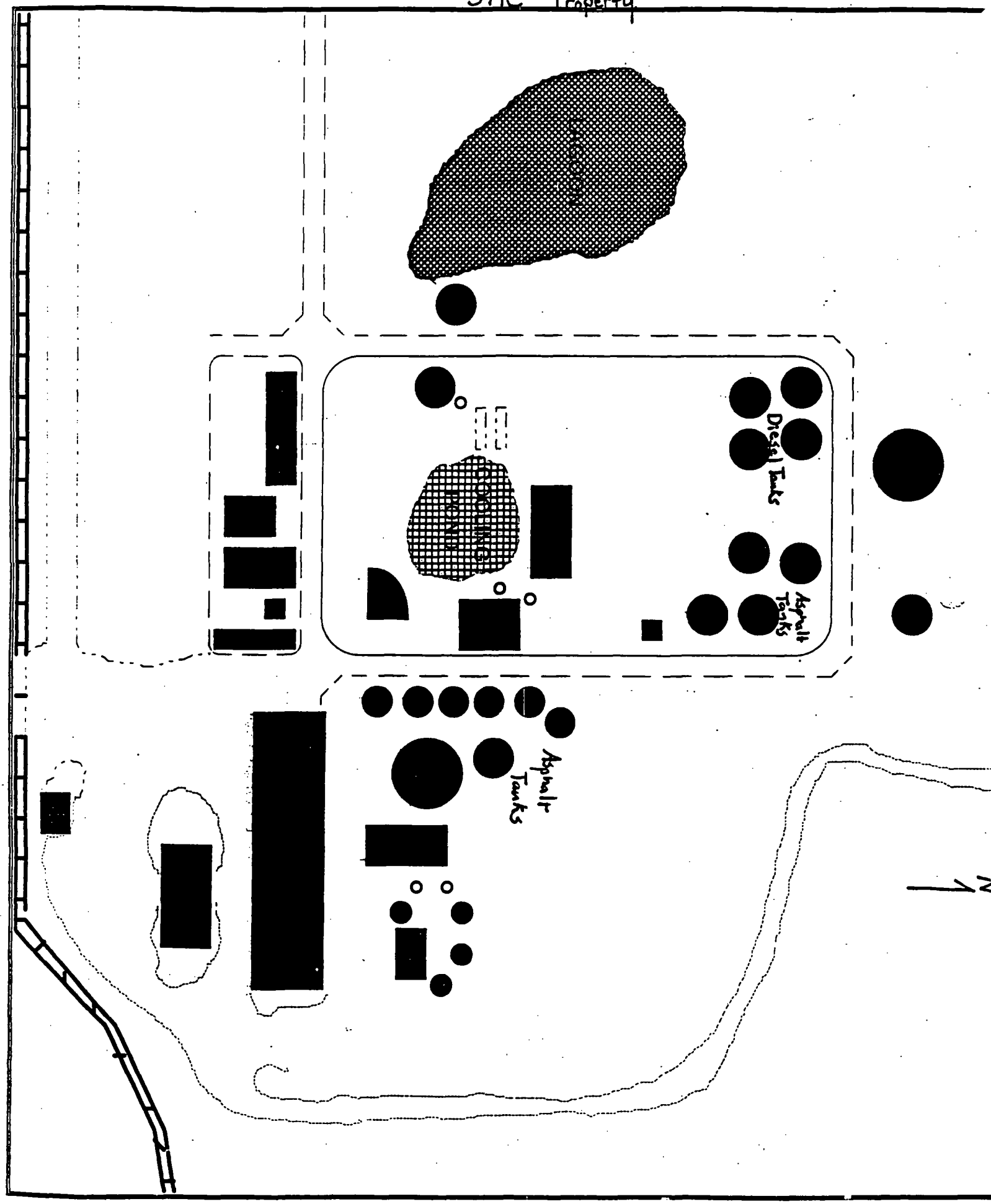
15. Tetra Tech EM Inc. Record of Telephone Conversation Concerning Water Supply for Hale County, AL. Between Ben Latham and Mr. Robert White, Hale County water System Department. July 20, 2000.

16. Tetra Tech EM Inc, Project Note: Calculation of Population Utilizing Public Drinking Water Sources Located within 4-Radial Miles of the Cracker Asphalt Site. July 20, 2000.

FIGURE 1
Cracker Asphalt Facility Site
(1-mile radius map)



Source: U.S.G.S. 7.5 Minute Topographic Quadrangle


SBC Property
Diesel Tanks
Asphalt Tanks
Asphalt Tanks

CONFIDENTIAL

HAZARD RANKING SYSTEM PRELIMINARY SCORE FOR MOUNDVILLE, HALE COUNTY, ALABAMA EPA ID NO. AL000472712

Pathways evaluated using the Site Inspection (SI) Worksheets were groundwater migration, surface water migration, soil exposure, and air migration.

Pathway Scores

$S_{gw} = 34.41$
$S_{sw} = 95.77$
$S_{se} = 2.478$
$S_{air} = 5.00$

OVERALL SCORE = 50.96

Sources and Waste Characteristics

The Cracker property was used for asphalt refining and storage for an unknown period ending in 1968, when use of the property for metal fabrication was initiated. The aboveground storage tanks (AST) and various lagoons formerly used prior to 1968 during asphalt production have not been removed from the property. One tank which has been used since 1968 by Southern Resins Company for storage of petroleum solvents.

The site score for the Cracker Asphalt facility was based on a hazardous waste quantity (HWQ) value of 10,000 for the groundwater, surface water, soil exposure, and air migration pathways. Waste quantity information was derived from the preliminary assessment (PA) and site investigation (SI) completed for the property during 1994 and 1996, respectively. The source areas on the property have been abandoned; however, no known removal or remediation of the sources has occurred to date. Due to the lack of qualified source removals, all sources on the property are available for Hazard Ranking System (HRS) evaluation. Sources of contamination at the Cracker facility consist of ASTs with a total volume of approximately 5,350,000 gallons, surface impoundments with a total volume of approximately 296,200 cubic feet, and potentially contaminated soil located throughout the 25-acre property (ADEM 1996; ADEM 1994).

Analytical results of surface soil samples collected from soils within and in the vicinity of the on-site impoundments during the completion of the SI indicated elevated levels of volatile organic compounds (VOC) and semivolatile organic compounds (SVOC) (ADEM 1996, pg. 12).

Groundwater Migration Pathway

The groundwater migration pathway is of concern at the Cracker site due to an observed release (primarily VOCs) and the presence of two public drinking water wells located 1.5 and 3.75 miles from the site. No known drinking water targets have been impacted from the release to groundwater from the site, and groundwater likely flows away from the potential drinking water targets. Due to the location and proximity of the surrounding drinking water sources, it is unlikely that drinking water sources would be impacted by the release from the site.

Each of the two wells located within the 4-mile target distance limit contributes equally to the Moundville water system and serves an estimated total population of 3,445. In addition to serving the residents of Moundville, Hale county Water System obtains approximately 40 percent of their water from the two Moundville wells. Hale County operates a blended public drinking water system that serves an estimated total population of 8,033. Based on the public drinking water information obtained for the completion of this report, approximately 3,330 people are served by drinking water sources located between 1.0 and 2.0 miles from the site, and 3,228 people are served by drinking water sources located between 3.0 and 4.0 miles from the site (Tetra Tech 2000).

The town of Moundville does not maintain records for the number or locations of private drinking water wells located within the town; however, based on correspondence with the Moundville Water Department no known private drinking water wells are located in the vicinity of the Cracker site. For purposes of this investigation, a conservative approach has been used to assess the potential drinking water targets located in the vicinity of the site; one private drinking water well has been assumed to exist within each of the distance rings up to 1 radial mile from the site (0 to 0.25 mile, 0.25 to 0.5 mile, and 0.5 to 1.0 mile).

Surface Water Migration Pathway

The surface water migration pathway is of concern at the Cracker site due to an observed release through direct observation of documented contaminated seeps migrating to surface water surrounding the property. To date, no surface water pathway samples have been collected from an area that can be considered part of the surface water pathway for HRS scoring purposes. Analytical results from the seep samples indicated elevated concentrations of VOCs, which are at least partially attributable to the historic use of the property and were observed to migrate to the surface water in the vicinity of the site (ADEM 1996, pg. 10).

The surface water pathway has been evaluated based on an observed release from the Cracker property to the Carthage Branch, which flows into the Black Warrior River. Both surface water bodies located along the 15-mile surface water pathway are considered protected by the Clean Water Act, and no known surface water intakes are located along the 15-mile surface water pathway. Due to the minimal flow rate of the Carthage Branch, it is not likely a fishery. The Black Warrior River is large enough to support fish species that may be consumed (ADEM 1996). In addition to a potentially impacted fishery, approximately 26 miles of wetland frontage are located along the Black Warrior River within the 15-mile target distance limit (USGS 1983). Nine federally listed threatened and endangered species

are known to inhabit the Black Warrior River and could be impacted by a surface water release from the Cracker property (USFWS 1992).

No surface water pathway samples have been collected from the property. However, an observed release has been used to score the pathway due to the direct observation of laboratory, confirmed contaminated groundwater seeps flowing into surface water.

Soil Exposure and Air Migration

Due to the lack of potential receptors on the Cracker property, the soil exposure and the air migration pathways are of minimal concern. The property is adjacent to the Black Warrior River and wetlands north and west of the property. East of the site is the Lawtner Chemical Plant and the Carthage Branch. Land use south of the site is residential and agricultural. The nearest residence is located approximately 400 feet south of the site.

During the SI, surface soil samples were collected from source areas and potentially contaminated surficial soil on the property. Analytical results of the soil samples indicated elevated concentrations of VOCs and SVOCs in excess of reference criteria. No soil samples were collected from the residences in the site vicinity.

The population within 1 mile of the Cracker property is approximately 102 people, and the population within 4 miles of the property is approximately 2,341 (Tetra Tech 2000). In addition to the population in the vicinity of the site, there are approximately 20 on-site workers (ADEM 1996). No known potential sensitive environments are on the site; however 10 federally threatened or endangered species may be located within 4 miles of the site (USFWS 1992).

Surface soil samples collected from the property have indicated an observed release to the soil exposure pathway. Potential targets of contaminant migration from the site via the soil exposure and the air migration pathways include on-site workers, and sensitive species and wetlands. No known migration of site contaminants has occurred from the property via the soil or air migration pathways, and it is unlikely that any of the potential receptors in the site vicinity have been impacted.

Conclusions

Due to the potential sensitive receptors located along the surface water pathway, it is recommended that surface water and sediment samples be collected along the surface water pathway and an HRS package be prepared to more accurately determine the threat via the surface water pathway. The groundwater, soil exposure, and air migration pathways are of minimal concern due to the lack of potential receptors along these migration pathways; however, additional soil and groundwater samples should be collected from the property.

Confidential

SCORESHEETS

Confidential

GROUNDWATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

	Likelihood of Release to an Aquifer	Maximum Value	Value Assigned	
1.	Observed Release	550	550	
2.	Potential to Release			
	2a. Containment	10		
	2b. Net Precipitation	10		
	2c. Depth to Aquifer	5		
	2d. Travel Time	35		
	2e. Potential to Release (lines 2a x [2b + 2c + 2d])	500		
3.	Likelihood of Release (higher of lines 1 and 2e)	550		550
	Waste Characteristics			
4.	Toxicity/Mobility	[a]	100	
5.	Hazardous Waste Quantity	[a]	10.000	
6.	Waste Characteristics	100		32
	Targets			
7.	Nearest Well	50	20	
8.	Population			
	8a. Level I Concentrations	[b]	0	
	8b. Level II Concentrations	[b]	0	
	8c. Potential Contamination	[b]	0	
	8d. Population (lines 8a + 8b + 8c)	[b]	136.3	
9.	Resources	5	5	
10.	Wellhead Protection Area	20	0	
11.	Targets (lines 7 + 8d + 9 + 10)	[b]		161.3
	Groundwater Migration Score for an Aquifer			
12.	Aquifer Score ([lines 3 x 6 x 11]/82,500)[c]	100	34.41	
	Groundwater Migration Pathway Score			
13.	Groundwater Migration Pathway Score (S_{gw})[c] (highest value from line 12 for all aquifers evaluated)	100		34.41

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
DRINKING WATER THREAT				
	Likelihood of Release			
1.	Observed Release	550	550	
2.	Potential to Release by Overland Flow			
	2a. Containment	10		
	2b. Runoff	25		
	2c. Distance to Surface Water	25		
	2d. Potential to Release by Overland Flow (lines 2a x [2b + 2c])	500		
3.	Potential to Release by Flood			
	3a. Containment (Flood)	10		
	3b. Flood Frequency	50		
	3c. Potential to Release by Flood (lines 3a x 3b)	500		
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500		
5.	Likelihood of Release (higher of lines 1 and 4)	550		550
	Waste Characteristics			
6.	Toxicity/Persistence	[a]	40	
7.	Hazardous Waste Quantity	[a]	10,000	
8.	Waste Characteristics	100		18
	Targets			
9.	Nearest Intake	50	0	
10.	Population			
	10a. Level I Concentrations	[b]	0	
	10b. Level II Concentrations	[b]	0	
	10c. Potential Contamination	[b]	0	
	10d. Population (lines 10a + 10b + 10c)	[b]	0	
11.	Resources	5	5	
12.	Targets (lines 9 + 10d + 11)	[b]		5

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET, Continued

Factor Categories and Factors		Maximum Value	Value Assigned	
DRINKING WATER THREAT (Concluded)				
	Drinking Water Threat Score			
13.	Drinking Water Threat Score ([lines 5 x 8 x 12]/82,500, subject to a maximum of 100)	100		0.60
HUMAN FOOD CHAIN THREAT				
	Likelihood of Release			
14.	Likelihood of Release (value from line 5)	550		550
	Waste Characteristics			
15.	Toxicity/Persistence/Bioaccumulation	[a]	2E+05	
16.	Hazardous Waste Quantity	[a]	10,000	
17.	Waste Characteristics	1,000		180
	Targets			
18.	Food Chain Individual	50	0	
19.	Population			
	19a. Level I Concentrations	[b]	0	
	19b. Level II Concentrations	[b]	0	
	19c. Potential Human Food Chain Contamination	[b]	0	
	19d. Population (lines 19a + 19b + 19c)	[b]	0	
20.	Targets (lines 18 + 19d)	[b]		0
	Human Food Chain Threat Score			
21.	Human Food Chain Threat Score ([lines 14 x 17 x 20]/82,500, subject to a maximum of 100)	100		0
ENVIRONMENTAL THREAT				
	Likelihood of Release			
22.	Likelihood of Release (value from line 5)	550		550

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET, Concluded

Factor Categories and Factors	Maximum Value	Value Assigned	
ENVIRONMENTAL THREAT (Concluded)			
Waste Characteristics			
23. Ecosystem Toxicity/Persistence/ Bioaccumulation	[a]	5E+08	
24. Hazardous Waste Quantity	[a]	10,000	
25. Waste Characteristics	1,000		1,000
Targets			
26. Sensitive Environments			
26a. Level I Concentrations	[b]	0	
26b. Level II Concentrations	[b]	0	
26c. Potential Contamination	[b]	1.675	
26d. Sensitive Environments (lines 26a + 26b + 26c)	[b]	1.675	
27. Targets (value from line 26d)	[b]		1.675
Environmental Threat Score			
28. Environmental Threat Score ([lines 22 x 25 x 27]/82,500, subject to a maximum of 60)	60		11.16
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED			
29. Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)	100		11.76
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30. Component Score (S_{of})[c] (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100		11.76

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.
- Not evaluated.
* Default value.

SOIL EXPOSURE PATHWAY SCORESHEET

Factor Categories and Factors		Maximum Value	Value Assigned	
RESIDENT POPULATION THREAT				
	Likelihood of Exposure			
1.	Likelihood of Exposure	550		550
	Waste Characteristics			
2.	Toxicity	[a]	100	
3.	Hazardous Waste Quantity	[a]	10,000	
4.	Waste Characteristics	100		32
	Targets			
5.	Resident Individual	50	0	
6.	Resident Population			
	6a. Level I Concentrations	[b]	0	
	6b. Level II Concentrations	[b]	0	
	6c. Resident Population (lines 6a + 6b)	[b]	0	
7.	Workers	15	5	
8.	Resources	5	0	
9.	Terrestrial Sensitive Environments	[d]	5	
10.	Targets (lines 5 + 6c + 7 + 8 + 9)	[b]		5
	Resident Population Threat Score			
11.	Resident Population Threat ([lines 1 x 4 x 10]/82,500)	[b]		1.07
NEARBY POPULATION THREAT				
	Likelihood of Exposure			
12.	Attractiveness/Accessibility	100	10	
13.	Area of Contamination	100	5	
14.	Likelihood of Exposure	500		5
	Waste Characteristics			
15.	Toxicity	[a]	100	
16.	Hazardous Waste Quantity	[a]	10,000	
17.	Waste Characteristics	100		32

SOIL EXPOSURE PATHWAY SCORESHEET, Concluded

Factor Categories and Factors	Maximum Value	Value Assigned	
NEARBY POPULATION THREAT (Concluded)			
Targets			
18. Nearby Individual	1	1	
19. Population Within 1 Mile	[b]	0.6	
20. Targets (lines 18 + 19)	[b]		1.6
Nearby Population Threat Score			
21. Nearby Population Threat ([lines 14 x 17 x 20]/82,500)	[b]		1.408
SOIL EXPOSURE PATHWAY SCORE			
22. Soil Exposure Pathway Score (S_{soil})[c] (lines 11 + 21, subject to a maximum of 100)	100		2.478

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.
[d] No specific maximum value applies to factor. However, a pathway score based solely on sensitive environments is limited to a maximum value of 60.

AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

	Likelihood of Release	Maximum Value	Value Assigned	
1.	Observed Release	550		
2.	Potential to Release			
	2a. Gas Potential to Release	500		
	2b. Particulate Potential to Release	500	500	
	2c. Potential to release higher of lines 2a and 2b)	500	500	
3.	Likelihood of Release (higher of lines 1 and 2c)	550		500
	Waste Characteristics			
4.	Toxicity/Mobility	[a]	100	
5.	Hazardous Waste Quantity	[a]	10,000	
6.	Waste Characteristics	100		32
	Targets			
7.	Nearest Individual	50	20	
8.	Population			
	8a. Level I Concentrations	[b]	0	
	8b. Level II Concentrations	[b]	0	
	8c. Potential Contamination	[b]	2.58	
	8d. Population (lines 8a + 8b + 8c)	[b]	2.58	
9.	Resources	5	0	
10.	Sensitive Environments			
	10a. Actual Contamination	[c]	0	
	10b. Potential Contamination	[c]	3.225	
	10c. Sensitive Environments (lines 10a + 10b)	[c]	3.225	
11.	Targets (lines 7 + 8d + 9 + 10c)	[b]		25.805
	Air Migration Pathway Score			
12.	Air Migration Pathway Score (S_{air})[d] ([lines 3 x 6 x 11]/82,500)	100		5.00

---

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] No specific maximum value applies to factor. However, a pathway score based solely on sensitive environments is limited to a maximum value of 60.
[d] Do not round to nearest integer.
- Not evaluated.
* Default value.

Confidential

CERCLA Eligibility Form

Site Name: Cracker Asphalt

City/County/State: Moundville, Tuscaloosa County, Alabama

EPA ID Number: AL0000472712

Type of Facility: Generator x Transporter ___ Disposal x
Treatment ___ Storage (more than 90 days) x

	Yes	No
Has this facility treated, stored or disposed of a RCRA hazardous waste since Nov. 19, 1980?	___	X
Has a RCRA Facility Assessment (RFA) been performed on this site?	___	X
Does the facility have a RCRA operating or post-closure permit? If so, date issued:	___	X
Did the facility file a RCRA Part A application?	___	X
If so:		
1) Does the facility currently have interim status?	___	___
2) Did the facility withdraw its interim status?	___	___
3) Is the facility a known or possible protective filer?	___	___
Is the facility a late (after Nov. 19, 1980) or non-filer that has been identified by EPA or the State?	___	X
Is the site a Federal Facility?	___	X
Is there at least one source onsite which is not covered by CERCLA Petroleum Exclusion Legislation?	X	___
Is the facility owned by an entity that has filed for bankruptcy under Federal or State laws?	___	X
Has the facility lost authorization to operate or had its interim status revoked?	___	X
Has the facility been involved in any other RCRA enforcement action?	___	X

EPA United States Environmental Protection Agency

Envirofacts Warehouse — Superfund

Overview | Law EXIT EPA | Query | Model | Feedback | EF Home

CERCLIS Query Results

Page No. 1

SITE ID: Equal To: **0406243**
Results are based on data extracted on JAN-19-2000

Note: Click on the underlined CORPORATE LINK value for links to that company's environmental web pages. Click on the underlined MAPPING INFO value to obtain mapping information for the facility. Click on the underlined RECORD OF DECISION value for a RODS Site Report. Click on the underlined FACILITY_ID to view EPA Facility Information for this site.

Go To Bottom Of The Page

SUPERFUND SITE ID:	0406243	**SITE NAME:**	CRACKER ASPHALT
STREET ADDRESS:	CRACKER ROAD	**EPA FACILITY ID:**	AL0000472712
CITY NAME:	MOUNDVILLE	**OWNERSHIP STATUS:**	Unknown
STATE ABBR:	AL	**FEDERAL FACILITY:**	N
ZIP CODE:	35474	**NPL STATUS:**	Not on the NPL
COUNTY NAME:	HALE	**SITE INCIDENT TYPE:**	
CORPORATE LINK:	No	**RECORD OF DECISION (ROD) INFO:**	No
LATITUDE:		**EPA REGIONAL LINK:**	No
LONGITUDE:		**MAPPING INFO:**	MAP
SITE SMSA:			

Enforcement and Cleanup Actions

Action	Action ID	Planned Start Date	Planned End Date	Actual Start Date	Actual End Date	Responsibility	Planned Outcome	Urgency
SITE INSPECTION	001				02/06/1996	State, Fund Financed	Low	
PRELIMINARY ASSESSMENT	001			10/01/1993	10/25/1994	State, Fund Financed	High	
DISCOVERY	001				07/21/1994	EPA Fund-Financed		

Site Description

There were no Site Descriptions reported for this site.

PROJECT NOTE

Date: April 28, 2000	Project Number: 0071-2-150101
Name: M.F. Wendt Title: Information Specialist	Time: 1130 Signature:

Subject: Population within distance rings for Cracker Asphalt in Moundville, TN

The population within a 4-mile radius of the Cracker Asphalt, Moundville, TN facility was obtained from the U.S. Department of Commerce, LandView III Environmental Mapping Software, issued December 1997, which is based on the Bureau of the Census 1990 population data. The population is provided for each radius, from 0.25-mile to 4-miles. The population within the 0.25-mile distance ring was lifted from the LandView printout. The population within the other distance categories were obtained as follows:

- For the 0.25- to 0.50-mile distance ring, the population within 0.25 mile was subtracted from the population within 0.50 mile.
- For the 0.50- to 1-mile distance ring, the population within 0.50 mile was subtracted from the population within 1 mile.
- For the 1- to 2-mile distance ring, the population within 1 mile was subtracted from the population within 2 miles.
- For the 2- to 3-mile distance ring, the population within 2 miles was subtracted from the population within 3 miles.
- For the 3- to 4-mile distance ring, the population within 3 miles was subtracted from the population within 4 miles.

Population within Distance Rings	
Distance Ring: (miles)	Population: (number of persons)
0.00 - 0.25	6
0.25 - 0.50	19
0.50 - 1.0	52
1.0 - 2.0	229
2.0 - 3.0	383
3.0 - 4.0	529

RESPONSE REQUIRED

( ) None ( ) Phone call ( ) Memo ( ) Letter ( ) Report

Attach population data from LandView

cc: File (x) Project Manager (x) Principal Investigator Other (specify)

Population Data from LandView – Cracker Asphalt

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 2
Number Of Persons: 6
RADIUS: 0.25 miles

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 9
Number Of Persons: 25
RADIUS: 0.50 miles

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 26
Number Of Persons: 77
RADIUS: 1.00 miles

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 106
Number Of Persons: 306
RADIUS: 2.00 miles

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 238
Number Of Persons: 689
RADIUS: 3.00 miles

LOCATION: 33.011905, -87.622826
METHOD: Block Group Proration method.
Number Of Households: 421
Number Of Persons: 1218
RADIUS: 4.00 miles

RECORD OF TELEPHONE CONVERSATION

DATE: 7 / 20 / 00 (Month / Day / Year)

Project Number: 60071.2.150104.N

Site Name: CRACKER ASPHALT

Name: BEN LATHAM

Initiated Call ( )
Returned Call (✓)
Received Call ( )

Time _____ AM ____ PM ____

EAS ( ) CEN ( ) MTN ( ) PAC ( )

Contact: ROBERT WHITE

Firm/Agency: HALE COUNTY WATER SYSTEM

Street: _____

City: GREENSBORO State: AL

Zip: _____

Phone #: 334 624 8868 EXT: ____

SUBJECT: HALE COUNTY WATER SYSTEM

TELECON SUMMARY

MR WHITE CONFIRMED THAT HALE COUNTY PURCHASES APPROX 320,000 GAL/DAY OF WATER FROM THE MOUNDVILLE WATER WORKS - THE WATER CONTRIBUTES APPROX 40% TO THE COUNTY BLENDED SYSTEM

THERE ARE 2,975 CONNECTIONS TO THE SYSTEM.

REQUIRED RESPONSE

None (✓) Phone Call ( ) Memo ( ) Letter ( ) Report ( )

cc: File ( ) Proj. Mgr.( ) Prin. Inv.( ) Other ( ) _____ Specify

JBJ.

RECORD OF TELEPHONE CONVERSATION

DATE: 7 / 20 / 00 (Month / Day / Year)

Project Number: 6007.2.160101.N

Site Name: CRACKER ASPHALT

Name: BEN LATHAM
Initiated Call ( )
Returned Call (✓)
Received Call ( )
Time ____ AM ✓ PM ____
EAS ( ) CEN ( ) MTN ( ) PAC ( )

Contact: BONNIE BRANSHAW
Firm/Agency: MOUNDVILLE CITY HALL/ WATER DEPARTMENT
Street: ____
City: ____ State: AL
Zip: ____
Phone #: (205) 371-2141 EXT: —

SUBJECT: PUBLIC DRINKING WATER SUPPLY FOR MOUNDVILLE HALE & TUSCALOOSA COUNTY

TELECON SUMMARY

I SPOKE W/ MS. BRANSHAW SHE INFORMED ME THAT THE MOUNDVILLE WATER SYSTEM CONSISTS OF 2 WELLS WHICH HAVE BEEN IN USE FOR >50 YEARS (SAME WELLS AS FROM 91) THE WELLS ARE BLENDED PRIOR TO DISTRIBUTION - BOTH WELLS CONTRIBUTE EQUALLY TO THE TOWN SYSTEM - THERE ARE 1,226 CONNECTIONS TO THE SYSTEM (HAS DECREASED SINCE 1996)

HALE COUNTY WATER AUTHORITY PURCHASES APPROX 300,000 GAL/DAY FROM MOUNDVILLE

THE MAJORITY OF THE TOWN IS ON THE TOWN SYSTEM IF THERE ARE PRIVATE WELLS THEY ARE NOT RECORDED BUT SHE DOES NOT KNOW OF ANY.

REQUIRED RESPONSE

None (✓) Phone Call ( ) Memo ( ) Letter ( ) Report ( )

cc: File (✓) Proj. Mgr.( ) Prin. Inv.( ) Other ( ) ____
Specify

- WELL NO. 1 LOCATED 1.5 RADIAL MILES FROM SITE (SOUTH WEST)

- WELL NO. 2 LOCATED 3.75 MILES SOUTH OF SITE

MOUNDVILLE SYSTEM
EACH WELL CONTRIBUTES 50% TO SYSTEM - 1,276 CONNECTIONS (2.8 PEOPLE/HOUSEHOLD FOR HALE CO)
(2.6 PEOPLE/HOUSEHOL FOR TUSCALOOSA CO.)
2.7 AVERAGE PER AREA

1,276 X 2.7 = 3,445 TOTAL

1,723 WELL NO. 1
1,722 WELL NO. 2

HALE COUNTY WATER SYSTEM

PURCHASED WATER FROM MOUNDVILLE SYSTEM CONTRIBUTES 40% OF HALE COUNTY TOTAL SYSTEM
ASSUME 20% WELL NO 1.
20% WELL NO. 2.

2,975 TOTAL CONNECTIONS X 2.7 = 8,033 TOTAL

WELL NO. 1 = 1,607
WELL NO. 2 = 1,606

TOTAL FOR EACH WELL
WELL NO. 1 = 3,330 PEOPLE SERVED
WELL NO. 2 = 3,328 PEOPLE SERVED

PROJECT NOTE:

Wetland Acreage Calculation Cracker Asphalt
Ben Latham
10 May 2009

Distance Ring	Approximate Acres
0 – 0.25	8.6
0.25 – 0.5	80.3
0.5 – 1.0	281.2
1.0 – 2.0	516.5
2.0 – 3.0	>500
3.0 – 4.0	>500

Resources: USGS topographic maps for Alabama (Englewood; Fosters; Moundville East, and Moundville West)

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program, at (800) 638-6620.

APPROXIMATE SCALE

600 0 600 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
MOUNDVILLE,
ALABAMA
HALE AND TUSCALOOSA
COUNTIES

ONLY PANEL PRINTED

COMMUNITY-PANEL NUMBER
010096 0005 B

EFFECTIVE DATE:
JULY 18, 1985

Federal Emergency Management Agency

KEY TO MAP

Zone Designations*	ZONE C ZONE A ZONE C
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

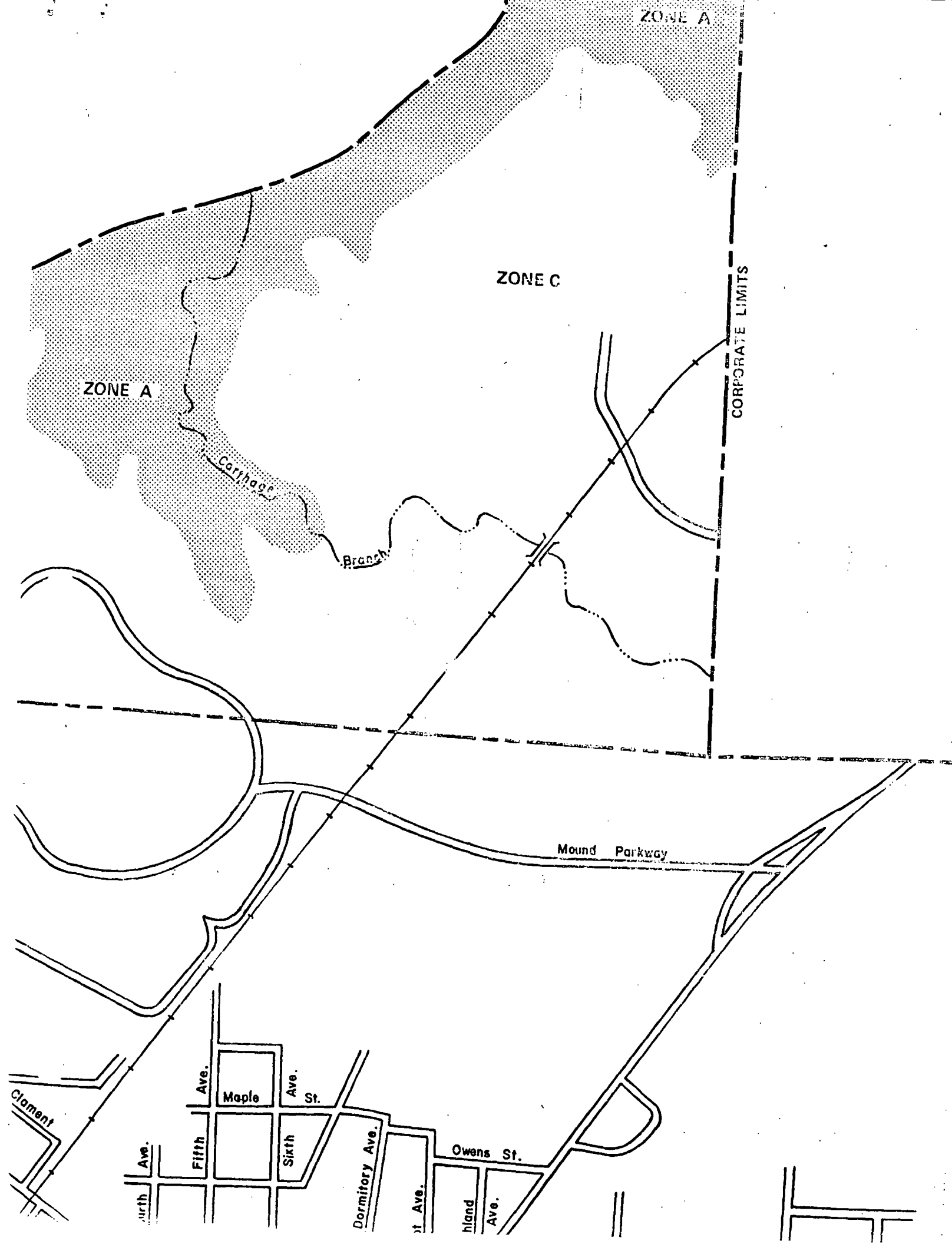
For adjoining map panels, see separately printed Map Index.

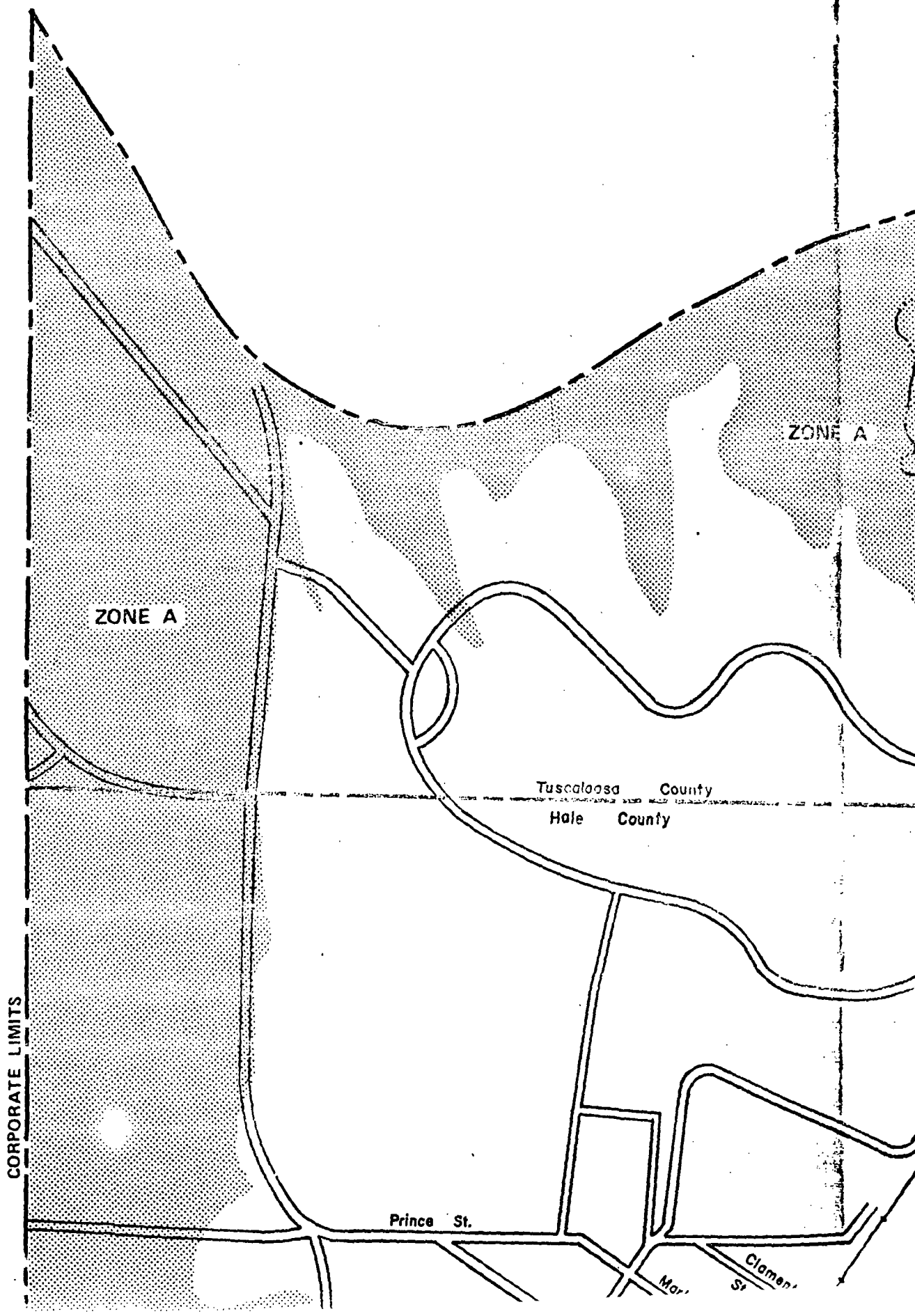
E LIMITS

INITIAL IDENTIFICATION:

JUNE 21, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:


ZONE A
ZONE C
ZONE A
CORPORATE LIMITS
Carthage
Branch
Mound Parkway
Clement
Ave.
Maple
Ave.
St.
Fifth
Sixth
Owens St.
Dormitory Ave.
Ave.


ZONE A
ZONE A
Tuscaloosa County
Hale County
CORPORATE LIMITS
Prince St.

SITE INSPECTION WORKSHEETS
(Region I version 6/30/95)

WARNING!!
EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.

SITE LOCATION			
Site Name: Cracker Asphalt			
Street Address: Cracker Road			
City: Moundville	State: AL	Zip Code: *35474*	Telephone:
CERCLIS ID No.: AL000472712	Coordinates: Latitude:33° 00′ 42.9″ N Longitude: 87° 37′ 22.2″ W		

OWNER/OPERATOR IDENTIFICATION					
Owner: Conrad Wesselhoeft			Operator: Same as owner		
Owner Address: Cracker Road			Operator Address:		
City: Moundville			City:		
State: AL	Zip Code: 35474	Telephone:	State:	Zip Code:	Telephone:

SITE EVALUATION	
Agency/Organization: Tetra Tech EM, Inc.	TDD No.: 04-1501-0001
Investigator: J. Benjamin Latham	Date: August 25, 2000

EPA CONTACT		
EPA SAM: Annie Godfrey		
Address: 61 Fursyth Street, SW, 11th Floor		
City: Atlanta	State: GA	Zip Code: 30303
Telephone: (404) 562-8814		
EPA Reviewer:	Date:	

GENERAL INFORMATION

Site Description and Operational History: Provide a brief description of the site and its operational history. State the site name, owner, operator, type of facility and operations, size of property, active or inactive status, and years of waste generation. Summarize waste treatment, storage, or disposal activities that have or may have occurred at the site; note whether these activities are documented or alleged. Identify all source types and prior spills, floods, or fires. Summarize highlights of the PA and other investigations. Cite references.

Refer to appropriate sections of the reassessment report.

SOURCE EVALUATION

Description of each Source: Identify each source area by name and number, and classify each source into a source type category (see SI Table 1). Describe the dimensions of each source. Identify the hazardous substances associated with each source. Determine the containment characteristics for each source by pathway (see HRS Tables 3-2, 4-2, 6-3 and 6-9).

Source No. 1: Cooling Pond (Surface Impoundment)

An approximate 224,000 cubic foot cooling pond is centrally located on the property. Based on available file information the cooling pond has been filled with soil; however, no know source closure activities have been conducted for the source area. This source area is no longer actively used on the property and use of the source likely ceased in 1968. The historic use of the source could not be located in available file information. For the purposes of this investigation this source will be considered available to the groundwater, surface water, soil exposure and air migration pathways.

Source No. 2: Asphalt Skimmers (Surface Impoundment)

An approximate 7,200 cubic foot asphalt skimmer is located on the property. This source area is no longer actively used on the property and use of the source area likely ceased in 1968. No know closure activities have been conducted for the source area. The historic use of the source could not be located in available file information. For the purposes of this investigation this source area will be evaluated for potential migration to the groundwater, surface water, soil exposure, and air migration pathways.

Source No. 3: Sludge Pond (Surface Impoundment)

An approximate 65,000 cubic foot pond backfilled with petroleum contaminated sludge and sediment. Dates of the use of the pond and the date when the pond was filled could not be located in available file information. The historic use of the source could not be located in available file information. During this investigation this source area will be evaluated for potential migration to the groundwater, surface water, soil exposure, and air migration pathways.

Source No. 4: Asphalt Storage and Production ASTs (Tanks)

Greater than twenty ASTs are located on the property with a total approximate capacity of 5,350,000 gallons. Historically the tanks were used for the storage of unspecified various petroleum compounds and asphalt which ceased in 1968. Most recently one of the tanks was leased for the storage of petroleum solvents. Evidence of a release to surface soil in the vicinity of one of the tanks was noted during an ADEM inspection of the property completed in 1986. Although the majority of the tanks have not been used since approximately 1968 they remain on the property and no known State of Alabama or EPA approved closure of the tanks has occurred. For the purposes of this investigation this source will be evaluated for the potential migration to the groundwater, surface water, soil exposure, and air migration pathways.

Source No. 5: Contaminated Soil Located Throughout the Property (Contaminated Soil)

Based on the available file information, including past soil sampling activities, historical use of the property, and the distribution of potential source areas on the property, it is not unlikely that the entire extent of surficial soil on the property has been impacted by historical releases of hazardous materials. For purposes of this investigation all surface soils on the 25 acre property will be considered a source area. During this investigation this source area will be evaluated for potential migration to the groundwater, surface water, soil exposure, and air migration pathways.

Source No.	Source Type	Pathway Availability			
		GW	SW	SE	A
2	Surface Impoundment	Y	Y	Y	Y
2	Surface Impoundment	Y	Y	Y	Y
3	Surface Impoundment	Y	Y	Y	Y
4	Tanks	Y	Y	Y	Y
5	Contaminated Soil	Y	Y	Y	Y

Legend: Y = available to pathway
N = not available to pathway
? = availability unknown
I = ineligible waste

SOURCE EVALUATION (Continued)

Hazardous Waste Quantity (HWQ) Calculations: SI Tables 1 and 2 (See HRS Tables 2-5, 2-6, and 5-2).

For each source, provide HWQ calculations by tier and provide assumptions. Note: HWQ calculations may be different for the soil exposure pathway.

Insufficient information is available to evaluate source Nos. 1, 2, 3, and 4 on *Tier A (Hazardous Constituent Quantity),* or *Tier B (Hazardous Waste Stream Quantity).*

1. Cooling Pond (Surface Impoundment)

Tier C (Volume)

The volume of the former Cooling Pond is approximately 224,000 cubic feet. From SI Table 1, for multiple source sites the source receives a Waste Quantity (WQ) score of 3,318.

From SI Table 1, WQ = 224,000 ÷ 67.5 = 3,318.5

Source No. 1 WQ value = 3,318.5

2. Asphalt Skimmers (Surface Impoundment)

Tier C (Volume)

The volume of the former Asphalt Skimmers is approximately 7,200 cubic feet. From SI Table 1, for multiple source sites the source receives a WQ score of 106.7

From SI Table 1, WQ = 7,200 ÷ 67.5 = 106.7

Source No. 2 WQ value = 106.7

3. Sludge Pond (Surface Impoundment)

Tier C (Volume)

The volume of the Sludge Pond is approximately 65,000 cubic feet. From SI Table 1, for multiple source sites the source receives a WQ score of 963.0.

From SI tale 1, WQ = 65,000 ÷ 67.5 = 963.0

Source No. 3 WQ value = 963.0

4. Asphalt and Petroleum ASTs (Tanks)

Tier C (Volume)

The total volume of the USTs on the property is approximately 5,350,000. From SI Table 1, for multiple source sites the source receives a WQ score of 10,700.

From SI Table 1, WQ = 5,350,000 ÷ 500 = 10,700

Source No 4 WQ value = 10,700

5. Contaminated Soil Located Throughout the Property(Contaminated Soil)

Tier D (Area)

The area of the property is approximately 25 acres. From SI Table 1, for multiple source sites the source receives a WQ score of 32.1.

From SI Table 1, WQ = 25 ÷ 0.78 = 32.1

Source No. 5 WQ value = 32.1

Based on the WQ for Source Nos. 1, 2, 3, 4 and 5 the site HWQ value for the Groundwater, Surface Water, Soil Exposure, and Air Migration Pathway is 3,318.5 + 106.7 + 963.0 + 10,700 + 32.1 = 15,119.8. From SI Table 2 for multiple source sites, a site HWQ value of 10,000 is assigned.

GW HWQ = 10,000
SW HWQ = 10,000
SE HWQ = 10,000
AIR HWQ = 10,000

SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES

		Single Source Sites (assigned HWQ scores)				Multiple Source Sites
Tier	**Source Type**	**HWQ = 10**	**HWQ = 100**	**HWQ = 10,000**	**HWQ = 1,000,000**	**Divisors for Assigning Source WQ Values**
A Hazardous Constituent Quantity	N/A	HWQ = 1 if Hazardous Constituent Quantity data are complete HWQ = 10 if Hazardous Constituent Quantity data are not complete	>100 to 10,000 lbs	>10,000 to 1 million lbs	> 1 million lbs	lbs ÷ 1
B Hazardous Wastestream Quantity	N/A	≤500,000 lbs	>500,000 to 50 million lbs	>50 million to 5 billion lbs	>5 billion lbs	lbs ÷ 5,000
C Volume	Landfill	≤6.75 million ft^3 ≤250,000 yd^3	>6.75 million to 675 million ft^3 >250,000 to 25 million yd^3	>675 million to 67.5 billion ft^3 >25 million to 2.5 billion yd^3	>67.5 billion ft^3 >2.5 billion yd^3	ft^3 ÷ 67,500 yd^3 ÷ 2,500
	Surface impoundment	≤6,750 ft^3 ≤250 yd^3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3	>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	>67.5 million ft^3 >2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5
	Drums	≤1,000 drums	>1,000 to 100,000 drums	>100,000 to 10 million drums	>10 million drums	drums ÷ 10
	Tanks and non-drum containers	≤50,000 gallons	>50,000 to 5 million gallons	>5 million to 500 million gallons	>500 million gals.	gallons ÷ 500
	Contaminated soil	≤6.75 million ft^3 ≤250,000 yd^3	>6.75 million to 675 million ft^3 >250,000 to 25 million yd^3	>675 million to 67.5 billion ft^3 >25 million to 2.5 billion yd^3	>67.5 billion ft^3 >2.5 billion yd^3	ft^3 ÷ 67,500 yd^3 ÷ 2,500
	Pile	≤6,750 ft^3 ≤250 yd^3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3	>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	>67.5 million ft^3 >2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5
	Other	≤6,750 ft^3 ≤250 yd^3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3	>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	>67.5 million ft^3 >2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5

SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES

		Single Source Sites (assigned HWQ scores)				Multiple Source Sites
Tier	Source Type	HWQ = 10	HWQ = 100	HWQ = 10,000	HWQ = 1,000,000	Divisors for Assigning Source WQ Values
D Area	Landfill	≤340,000 ft^2 ≤7.8 acres	>340,000 to 34 million ft^2 >7.8 to 780 acres	>34 million to 3.4 bil. ft^2 >780 to 78,000 acres	>3.4 billion ft^2 >78,000 acres	$ft^2 \div 3,400$ acres ÷ 0.078
	Surface Impoundment	≤1,300 ft^2 ≤0.029 acres	>1,300 to 130,000 ft^2 >0.029 to 2.9 acres	>130,000 to 13 million ft^2 >2.9 to 290 acres	>13 million ft^2 >290 acres	$ft^2 \div 13$ acres ÷ 0.00029
	Contaminated Soil	≤3.4 million ft^2 ≤78 acres	>3.4 million to 340 million ft^2 >78 to 7,800 acres	>340 million to 34 bil. ft^2 >7,800 to 780,000 acres	>34 billion ft^2 >780,000 acres	$ft^2 \div 34,000$ acres ÷ 0.78
	Pile	≤1,300 ft^2 ≤0.029 acres	>1,300 to 130,000 ft^2 >0.029 to 2.9 acres	>130,000 to 13 million ft^2 >2.9 to 290 acres	>13 million ft^2 >290 acres	$ft^2 \div 13$ acres ÷ 0.00029
	Land treatment	≤27,000 ft^2 ≤0.62 acres	>27,000 to 2.7 million ft^2 >0.62 to 62 acres	>2.7 mil. to 270 million ft^2 >62 to 6,200 acres	>270 million ft^2 >6,200 acres	$ft^2 \div 270$ acres ÷ 0.0062

1 ton = 2,000 lbs = 1 yd^3 = 4 drums = 200 gallons

SI TABLE 2: HWQ SCORES FOR MULTIPLE SOURCE SITES

Site WQ Total	HWQ Score
0	0
1[a] to 100	1[b]
>100 to 10,000	100
>10,000 to 1,000,000	10,000
>1,000,000	1,000,000

[a]If the HWQ total is between 0 and 1, round it to 1.
[b]If the hazardous constituent quantity data are not complete, assign the score of 10.

SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

Enter "NA" for substances which are not available to a pathway.
Enter "NL" for substance values not listed in SCDM.
Provide footnote for substances listed in table but not used for scoring purposes

Sources:
1. Surface Impoundment
2. Surface Impoundment
3. Surface Impoundment
4. Tanks
5. Contaminated Soil

			GROUNDWATER PATHWAY		SURFACE WATER PATHWAY OVERLAND/FLOOD MIGRATION							
Source	Hazardous Substance	Toxicity	GW Mobility (HRS Table 3-8)	Tox. × Mobility Value (HRS Table 3-9)	Pers. (HRS Tables 4-10 and 4-11)	Tox. × Pers. Value (HRS Table 4-12)	Bioacc. Pot. (HRS Table 4-15)	Tox. × Pers. × Bioacc. Value (HRS Table 4-16)	Ecotox. (HRS Table 4-19)	Ecotox. × Pers (HRS Table 4-20)	Eco. Bioacc. Pot. (HRS Table 4-20)	Ecotox. × Pers. × Eco. Bioacc. Value (HRS 4-21)
1,2,3,4,5	Benzene	100	1	100	0.4	40	5,000	2E+05	100	40	500	20,000
1,2,3,4,5	1,3-Cyclopentadiene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	m-Dichlorobenzene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	Ethylbenzene	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,4,5	Naphthalene	100	1	100	0.4	40	500	20,000	1,000	400	500	2E+05
1,2,3,4,5	n-Propylbenzene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	Isopropropylbenzene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	Styrene	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,4,5	Toluene	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,4,5	1,2,4-Trimethylbenzene	100	1	100	0.4	40	500	20,000	1,000	400	500	5E+08
1,2,3,4,5	1,2,3-Trimethylbenzene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	1,3,5-Trimethylbenzene	NL	NL	--	NL	--	NL	--	NL	--	NL	--
1,2,3,4,5	Xylene, m & p	10	1	10	0.4	4	50	200	100	40	50	2,000
1,2,3,4,5	Xylene, o	1	1	1	0.4	0.4	50	20	100	40	50	2,000
							BCF					

SCDM Version: JUN96

SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET
(Continued)

1. Surface Impoundment
2. Surface Impoundment
3. Surface Impoundment
4. Tanks
5. Contaminated Soil

			SURFACE WATER PATHWAY GROUNDWATER TO SURFACE WATER				AIR PATHWAY		
Source	Hazardous Substance	Toxicity	Tox. × Mob. × Pers. Value (HRS Table 4-26)	Tox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-28)	Ecotox. × Mob. × Pers. Value (HRS Table 4-29)	Ecotox. × Mob. × Pers. × Bioacc. Value (HRS Table 4-30)	Gaseous/ Particulate (HRS Table 6-13) (indicate G or P)	Mobility (HRS Table 6-11, 6-12)	Tox. × Mob. Value (HRS Table 6-13)
1,2,3,4,5	Benzene	100	40	2E+05	40	20,000	G	1	100
1,2,3,4,5	1,3-Cyclopentadiene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	m-Dichlorobenzene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	Ethylbenzene	10	4	200	40	2,000	G	1	10
1,2,3,4,5	Naphthalene	100	40	20,000	400	2E+05	G/P	0.2	20
1,2,3,4,5	n-Propylbenzene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	Isopropylbenzene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	Styrene	10	4	200	40	2,000	G	1	10
1,2,3,4,5	Toluene	10	4	200	40	2,000	G	1	10
1,2,3,4,5	1,2,4-Trimethylbenzene	100	40	20,000	400	2E+05	G	1	100
1,2,3,4,5	1,2,3-Trimethylbenzene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	1,3,5-Trimethylbenzene	NL	--	--	--	--	NL	NL	--
1,2,3,4,5	Xylene, m &p	10	4	200	40	2,000	G	1	10
1,2,3,4,5	Xylene, o	1	0.4	20	40	2,000	G	1	1

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References:
Notes:

GROUNDWATER PATHWAY

Pathway Description and Scoring Notes: Describe the Groundwater Migration Pathway. Include the names and brief descriptions of the aquifers underlying the site, the depth to groundwater, the locations of the nearest private and public drinking water supplies and the aquifers from which they draw, and the population relying upon groundwater drawn from within 4-radial miles of the site for their drinking water supplies.

Briefly discuss any sampling events relative to the Groundwater Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Groundwater Pathway for this site, or any key factors which influence your scoring rationale.

The Cracker property and the area surrounding the Cracker property lie within the Alluvial deltic Plain district of the East Coast Coastal Plain physiographic section. Physiographic features in the vicinity of the property consist of flat flood plains and terraces that have been formed by the Black Warrior River (ADEM 1996, pg. 4; DeJarnette 1987).

The geologic outcrops in the vicinity of Moundvill consist of gravel, sand, silt, and clay (SI Ref 6, p. 3-4) and in areas are as thick as 100 feet. On the property Quartinary age alluvium and terrace deposits overlie Cretaceous age Gordo and Coker formations of the Tuscaloosa Group. The Gordo Formation is generally not greater than 400 feet thick and consists of sand and gravel overlain by alternating lenticularbeds of sand and mottled clay. Beneath the Gordo Formation is the Coker Formation which ranges in thickness from less than 100 feet to up to 1,000 feet thick and consists of a non-marine gravel zone overlain by marine sand and clay. The sand and gravel beds of the tuscaloosa group are the major sources of groundwater within 4-radial miles of the Cracker property (DeJarnette 1987; Davis 1975). No geologic formation located within 4-radial miles of the Cracker property exhibits Karst characteristics.

On the Cracker property the terrace deposits consist of an upper fine-grained unit and a basal coarse-grained unit that lies on the Gordo Formation. The Gordo formation on the property consist of and upper unit of sand intermingled with varring amount of clay and clayey sand and is estimated to be between 35 to 120 feet in thickness beneath the Cracker property (ADEM 1996, pg. 6).

Available file information does not indicate the depth to groundwater and direction of groundwater flow on the property. Based on the topography of the area groundwater flow likely follows the general direction of the topography of the property and migrates radially from the property towards wetlands located north of the property, the Black Warrior River located west of the property, and the Carthage Branch located southwest of the property (USGS 1983).

Potential groundwater drinking water targets located within 4-radial miles of the property consist of both private and public drinking water users located within the town of Moundville. Two public drinking water source wells (Gordo Aquifer) operated by the Moundville Water Works system are located within 4-radial miles of the Cracker property. Water from the two wells (located 1.5 and 3.75 miles southwest and south of the property, respectively) is blended and distributed to the approximate 3,445 people on the Moundville system. In addition to supplying water for residents of Moundville approximately 300,000 gallons of water is sold to the Hale County Water System. Hale County receives approximately 40% of its drinking water from the

two wells located within 4-radial miles of the Cracker property. Hale county blends the water purchased from Moundville with water obtained from greater than 4-radial miles from the Cracker property to serve the approximate 8,033 on the Hale County system (Tetra Tech 2000).

Based on the public drinking water information obtained for the completion of this report approximately 3,330 people are served by drinking water sources located between 1.0 and 2.0-radial miles from the site and 3,228 people are served by drinking water sources located between 3.0 and 4.0-radial miles from the site (Tetra Tech 2000).

The Town of Moundville does not maintain records for the number or location of private drinking water wells located within the town; however, based on correspondence with the Moundville Water Department no know private drinking water wells are located in the vicinity of the Cracker site. For the purposes of this investigation a conservative approach has been used to assess the potential drinking water targets located in the vicinity of the site and 1 private drinking water well has been assumed to exist within each of the distance rings up to 1-radial mile from the site (0 to 0.25-radial miles, 0.25 to 0.5-radial miles, and 0.5 to 1.0-radial miles).

Public Groundwater Supply Sources Within 4-Radial Miles of Cracker Asphalt

Distance/ Direction from Site	Source Name	Location of Source[a]	Estimated Population Served	Source Type[b]
1.5 miles southwest	Well No. 1	Moundville	3,330	Overburden
3.75 miles south	Well No. 2	Moundville	3,328	Overburden

[a] Indicates Town in which well is located.
[b] Overburden, Bedrock, or Unknown.

Estimated Drinking Water Populations Served by Groundwater Sources Within 4-Radial Miles of Cracker Asphalt

Radial Distance From Cracker Asphalt (miles)	Estimated Population Served by Private Wells	Estimated Population Served by Public Wells	Total Estimated Population Served by Groundwater Sources Within the Ring
0.00 < 0.25	3	0	3
0.25 < 0.50	3	0	3
0.50 < 1.00	3	0	3
1.00 < 2.00	0	3,330	3,330
2.00 < 3.00	0	0	0
3.00 < 4.00	0	3,328	3,328
TOTAL	12	6,658	6,670

Five monitoring wells (CA-MW1 through CA-MW5) are located throughout the Cracker property. Additionally, 12 monitoring wells are located on the adjacent property to the west (Lawton Chemical). Groundwater samples collected from the Cracker property in 1995 were analyzed for VOCs and SVOCs (ADEM 1996). The following table summarizes the concentrations of the contaminants detected in the groundwater samples.

Contaminants Detected in Groundwater on the Cracker Asphalt Property (Samples collected 1995)

Contaminant	Monitoring Well				
	CA-MW1	CA-MW2	CA-MW3	CA-MW4	CA-MW5
Benzene	139.9 µg/l	37.5 µg/l	--	--	--
Ethylbenzene	121.9 µg/l	--	--	--	--
Naphthalene (VOC)	1,134.0 µg/l	662.7 µg/l	--	1.7 µg/l	0.9 µg/l
Napthalene (BNA)	558.69 µg/l	338.064 µg/l	--	--	--
n-Propylbenzene	--	53.2 µg/l	--	--	--
Toluene	13.2 µg/l	7.5 µg/l	--	--	--
1,2,4,-Trimethylbenzene	111.1 µg/l	50.6 µg/l	1.6 µg/l	--	--
m+p Xylene	57.6 µg/l	20.8 µg/l	--	--	--
o-Xylene	--	88.0 µg/l	--	--	--

(ADEM 1996, pg. 7)

µg/l = Micrograms per liter
VOC = Volatile organic compound
BNA = Base neutral analysis

Based on the analysis of groundwater samples collected from the Cracker property during 1995 there has been a release of hazardous substances (primarily VOCs) to the groundwater migration pathway attributable to the historic use of the property. No known groundwater drinking water targets have been effected by the release and based on the location and proximity of the surrounding public and private drinking water wells, it is unlikely that any drinking water sources would be impacted by the release of hazardous substances from the Cracker property to the groundwater table.

SI TABLE 4: GROUNDWATER OBSERVED RELEASE SUBSTANCES (BY AQUIFER)

Note: Mobility equals 1 for all observed release substances.

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Tox. x Mob. = Tox.	References
CA-MW1 (1995)	Benzene	139.9 µg/l	CA-MW7 (1995)	ND	100	SI
CA-MW1 (1995)	Ethylbenzene	121.9 µg/l	CA-MW7 (1995)	ND	10	SI
CA-MW1 (1995)	Naphthalene	1,134.0 µg/l	CA-MW7 (1995)	0.9 µg/l	100	SI
CA-MW2 (1995)	n-Propylenzene	53.2 µg/l	CA-MW7 (1995)	ND	--	SI
CA-MW1 (1995)	Tolune	13.2 µg/l	CA-MW7 (1995)	ND	10	SI
CA-MW1 (1995)	m+p-Xylene	57.6 µg/l	CA-MW7 (1995)	ND	10	SI
CA-MW2 (1995)	o-Xylene	88.0 µg/l	CA-MW7 (1995)	ND	1	SI
				Highest Value	x	

ND = Not detected

Notes: Groundwater samples collected from the Cracker property have been analyzed for VOCs and SVOCs only.

SI TABLE 5: GROUNDWATER ACTUAL CONTAMINATION TARGETS

Notes: Convert all results and SCDM values to ppb or µg/L.
If sum of percents calculated for I or J index is ≥ 100%, consider the well a Level I target; if sum of I or J index is < 100%, consider the well a Level II target.

Well ID: Level I: Level II:
Population Served: References:

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	RfD (J Index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
			Highest Percent		Sum of Percents		Sum of Percents	

SCDM Version: JUN96
Notes: No known groundwater actual contamination targets have been identified within 4-radial miles of the Cracker property.

GROUNDWATER PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE		Score	Data Type	Refs
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to the aquifer, assign a score of 550. Record observed release substances on SI Table 4.	550	+	SI
2.	POTENTIAL TO RELEASE: Depth to aquifer: __< 20__ feet. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340. Optionally, evaluate potential to release according to HRS Section 3.1.2.			
	LR =	550		

TARGETS		Score	Data Type	Refs
	Are any wells part of a blended system? Yes _x_ No __ If yes, attach a page to show apportionment calculations.			
3.	ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates that any target drinking water well for the aquifer has been exposed to a hazardous substance from the site, evaluate the factor score for the number of people served (SI Table 5). Level I: ___ people × 10 = ___ Level II: ___ people × 1 = ___ **Total =**	0		
4.	POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water wells for the aquifer or overlying aquifers that are not exposed to a hazardous substance from the site; record the population for each distance category in SI Table 6a or 6b. Sum the population values and multiply by 0.1.	136.3	+	Telecons
5.	NEAREST WELL: Assign a score of 50 for any Level I Actual Contamination Targets for the aquifer or overlying aquifer. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Targets exist, assign the Nearest Well Score from SI Table 6a or 6b. If no drinking water wells exist within 4 miles, assign 0.	20	-	
6.	WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA for the aquifer, or if a groundwater observed release has occurred within a WHPA, assign a score of 20; assign 5 if neither condition applies but a WHPA is within 4 miles; otherwise assign 0.	0		
7.	RESOURCES: Assign a score of 5 if one or more groundwater resource applies; assign 0 if none applies. • Irrigation (5 acre minimum) of commercial food crops or commercial forage crops • Watering or commercial livestock • Ingredient in commercial food preparation • Supply for commercial aquaculture • Supply for a major or designated water recreation area, excluding drinking water use	5	-	
	Sum of Targets T =	161.3		

Notes: Resource value and nearest private well are assumed.

SI TABLE 6 (FROM HRS TABLE 3-12): VALUES FOR POTENTIAL CONTAMINATION GROUNDWATER TARGET POPULATIONS

SI Table 6a: Other Than Karst Aquifers

Distance From Site	Pop.	Nearest Well (choose highest)	POPULATION SERVED BY WELLS WITHIN DISTANCE CATEGORY												Pop. Value	Ref.
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,000 to 3,000,000		
0 to 1/4 mile	3	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	4	assumed
> 1/4 to ½ mile	3	18	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122	2	assumed
> ½ to 1 mile	3	9	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385	1	assumed
> 1 to 2 miles	3,330	5	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842	939	telecons
> 2 to 3 miles	0	3	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219	0	
> 3 to 4 miles	3,328	2	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596	417	telecons
Nearest Well =		x												**Sum =**	1,363	

Notes: Due to lack of information private drinking water wells have been assumed to exist in the vicinity of the site.

GROUNDWATER PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS		Score	Data Type	Not Apply
8.	If any Actual Contamination Targets exist for the aquifer or overlying aquifers, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to groundwater.	10,000		
9.	Assign the highest groundwater toxicity × mobility value from SI Table 3 or 4.			
	Substance(s): Benzene / Napthalene / Toluene			
	Value: 100 / 100 / 10			
	From Table: 4 / 4 / 4			
10.	Multiply the groundwater toxicity × mobility and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below: (from HRS Table 2-7)			

Product	WC Score	*
0	0	
>0 to <10	1	
≥10 to <100	2	
≥100 to <1,000	3	
≥1,000 to <10,000	6	
≥10,000 to <1E+05	10	
≥1E+05 to <1E+06	18	
≥1E+06 to <1E+07	32	✓
≥1E+07 to <1E+08	56	

WC = 32

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the groundwater pathway score for each aquifer. Select the highest aquifer score. If the pathway score is greater than 100, assign 100.

GROUNDWATER PATHWAY CALCULATION: $\frac{550 \times 161.3 \times 32}{82,500}$ = 34.41

(Maximum of 100)

Notes:

SURFACE WATER PATHWAY

Pathway Description and Scoring Notes: Describe the Surface Water Migration Pathway. Identify the nearest source area with non-zero containment for the Surface Water Pathway and the location of the PPE. Include the length of the overland segment. Describe the in-water segment up to the target distance limit noting the stream flow characteristics of each reach and the locations of drinking water intakes, fisheries and sensitive environments along the 15-mile pathway.

Briefly discuss any sampling events relative to the Surface Water Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Surface Water Pathway for this site, or any factors which influenced your scoring rationale.

Note: If a site has more than one watershed or has both overland/flood and groundwater to surface water migration potential, document each scenario and use the higher scoring watershed/migration route to calculate the surface water migration pathway score. Provide a summary of the scores for all other watershed/migration routes.

The Cracker property is located within the Black Warrior Drainage Basin at approximately 170 feet above mean sea level (amsl) and is located outside of the 100 year flood plain (USGS 1983; FEMA 1985). Surface water drainage from the property likely migrates radially from the property toward wetlands associated with the Black Warrior River located approximately 1,000 feet northeast of the property, direct discharge to the Black Warrior River located approximately 500 feet northwest of the property, or the Carathage Branch located approximately 1,500 feet southwest of the property. All surface water originating on the Cracker property ultimately discharges to the Black Warrior River (USGS 1983).

The Carthage Branch is considered a minimal stream with an average annual flow rate less than 10 cubic feet per second (cfs) and the Black Warrior River is considered a moderate to large stream with an average annual flow rate of approximately 935 cfs (Moore 1991; ADEM 1996, pg. 10).

The fifteen mile surface water pathway endpoint is located approximately 1 mile downstream of where Buck Creek enters the Black Warrior River. Approximately 26 miles of wetlands frontage are located along the 15-mile downstream pathway from the property (USGS 1983).

Water Bodies Along the 15-Mile Downstream Pathway from Cracker Asphalt

Surface Water Body	Descriptor[a]	Length of Reach (miles)	Flow Characteristics (cfs)[b]	Length of Wetlands (miles)
Carthage Branch	Minimal stream	0.5	< 10	0
Black Warrior River	Moderate to large stream	14.5	100 - 1,000	26

[a] Minimal stream <10 cfs. Moderate to large stream >100-1,000 cfs.
[b] Cubic feet per second.

Nine endangered and threatened species are known to inhabit portions of the Black Warrior River and could potentially be impacted from a release of hazardous substances from the property (USFWS 1992).

Sensitive Environments Along the 15-Mile Downstream Pathway from Cracker Asphalt

Sensitive Environment Name	Sensitive Environment Type	Water Body	Downstream Distance from PPE (miles)	Flow Rate at Environment (cfs)[a]
Ovate Clubshell	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Turtle, flattened musk	Threatened species	Black Warrior River	0.5 to 15	100 - 1,000
Combshell, upland	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Kidneyshell, triangular	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Moccasinshell, Alabama	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Moccasinshell, Coosa	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Pigtoe, dark	Endangered species	Black Warrior River	0.5 to 15	100 - 1,000
Pocketbook, finelined	Threatened species	Black Warrior River	0.5 to 15	100 - 1,000
Alabama streak-sorus fern	Threatened species	Black Warrior River	0.5 to 15	100 - 1,000

[a] Cubic feet per second

There are no known surface water drinking water intakes located along the 15-mile downstream surface water pathway from the Cracker property (ADEM 1996, pg. 10). No known commercial or recreational fishing occurs on the Carthage Branch; however, the Black Warrior River is considered a fishery (ADEM, pg. 11).

During the completion of the SI groundwater seeps were observed along the erosional scarp adjacent to the Black Warrior River and along the banks of the Carthage Branch. Water samples collected from the seeps were analyzed for VOCs. Seep samples collected along the banks of the Black Warrior River and the Carthage Branch indicated the following contaminants: xylene (up to 320 μg/l), methylene chloride (up to 7.5 μg/l), chloroform (4.7 μg/l), benzene (up to 150 μg/l), ehthylbenzene (54 μg/l), toluene (28 μg/l), chloroethane (7.5 μg/l), benzene (150 μg/l), 1,3-

cytopentadiene (3.9 μg/l), propyl benzene (19 μg/l), and styrene (37 μg/l) (ADEM 1996, pg. 10). To date no known surface water or sediment samples have been collected from within the surface water pathway.

SI TABLE 7: SURFACE WATER OBSERVED RELEASE SUBSTANCES

List all substances that meet the criteria for an observed release to surface water; however do not eliminate a substance from this table if it has a BCF of less than 500.

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	BCF HRS Table 4-15	Toxicity × Persistence	Toxicity × Persis. × Bioaccum	Ecotoxicity × Persis. × Ecobioaccum	References
Seep B	Methylene chloride	7.5 µg/L	--	--	NL	NL	NL	NL	SI
Seep C	Chloroform	4.7 µg/L	--	--	5	40	200	20	SI
North Bluff	Benzene	150 µg/L	--	--	5,000	40	2E+05	20,000	SI
	Toluene	28 µg/L	--	--	50	4	200	2,000	SI
	Styrene	37 µg/L	--	--	50	4	200	2,000	SI
	Xylene	320 µg/L	--	--	50	4	200	2,000	SI
	1,3-Cyclopentdine	3.9 µg/L	--	--	--	--	--	--	SI
	Propylbenzene	19 µg/L	--	--	NL	NL	NL	NL	SI
					Highest Values	40	2E+05	20,000	

Notes: Sample results listed above are seeps samples collected from the vicinity of the property adjacent to surface water. Based on available file information no sediment and/or surfcae water samples have been collected from the property.

SI TABLE 8: SURFACE WATER DRINKING WATER ACTUAL CONTAMINATION TARGETS

Notes: Convert all results and SCDM values to ppb or µg/L.
If sum of percents calculated for I or J index is ≥ 100 percent, consider the intake a Level I target; if sum of I or J index is < 100 percent consider the intake a Level II target.

Intake ID: Sample Type: Level I: Level II: Population Served: References:

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	RfD (J Index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
NA								
			Highest Percent		Sum of Percents		Sum of Percents	

SCDM Version: JUN96
Notes: No surface water and/or sediment samples have been collected from the property.

SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET

LIKELIHOOD OF RELEASE - OVERLAND/FLOOD MIGRATION		Score	Data Type	Refs
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.	550		
2.	POTENTIAL TO RELEASE: Distance to surface water: __ (feet) If sampling data do not support a release to surface water in the watershed, use the table below to assign a score from the table below based on distance to surface water and flood frequency.			
Optionally, evaluate surface water potential to release according to HRS Section 4.1.2.1.2	Distance to surface water <2500 feet: 500 Distance to surface water >2500 feet, and: Site in annual or 10-yr floodplain: 500 Site in 100-yr floodplain: 400			
	LR =	550		

LIKELIHOOD OF RELEASE - GROUNDWATER TO SURFACE WATER MIGRATION		Score	Data Type	Refs
1.	OBSERVED RELEASE: If sampling data or direct observation support a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.			
NOTE:	Evaluate groundwater to surface water migration only for a surface water body that meets all of the following conditions:			
1)	A portion of the surface water is within 1 mile of site sources having a containment factor greater than 0.			
2)	No aquifer discontinuity is established between the source and the above portion of the surface water body.			
3)	The top of the uppermost aquifer is at or above the bottom of the surface water. Elevation of top of uppermost aquifer: _____ Elevation of bottom of surface water body: _____			
2.	POTENTIAL TO RELEASE: Depth to aquifer: ____ feet. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 feet or less assign a score of 500: otherwise assign a score of 340. Optionally, evaluate potential to release according to HRS Section 3.1.2.			
	LR =	NE		

Notes: NE = Not evaluated
Documented contaminated substances (groundwater seeps) have been observed to migrate from the Cracker property to the sirface water surrounding the property.

SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET
(Continued)

DRINKING WATER THREAT TARGETS	Score	Data Type	Refs
Record the water body type, flow, and number of people served by each drinking water intake within the distance limit in the watershed. If there is no drinking water intake within the target distance limit, assign 0 to factors 3, 4, and 5.			

Intake Name	Water Body Type	Flow	People Served

Are any intakes part of a blended system? Yes ___ No ___
If yes, attach a page to show appointment calculations.

3. ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates a drinking water intake has been exposed to a hazardous substance from the site, list the intake name and evaluate the factor score for the drinking water population (SI Table 8). Level I: ___ people × 10 = _____ Level II: ___ people × 1 = _____ **Total =**	0		
4. POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water intakes for the watershed that have not been exposed to a hazardous substance from the site. Assign the population values from SI Table 9. Sum the values and multiply by 0.1.	0		
5. NEAREST INTAKE: Assign a score of 50 for any Level I Actual Contamination Drinking Water Targets for the watershed. Assign a score of 45 if there are Level II targets for the watershed, but no Level I targets. If no Actual Contamination Drinking Water Targets exist, assign a score for the intake nearest the PPE from SI Table 9. If no drinking water intakes exist, assign 0.	0		
6. RESOURCES: Assign a score of 5 if one or more surface water resource applies; assign 0 if none applies. • Irrigation (5-acre minimum) of commercial food crops or commercial forage crops • Watering of commercial livestock • Ingredient in commercial food preparation • Major or designated water recreation area, excluding drinking water use.	5		
Sum of Targets T =	5		

Notes:

SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY[a]

Type of Surface Water Body[b]	Pop.	Nearest Intake	NUMBER OF PEOPLE								Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	
Minimal Stream (<10 cfs)	0	20	4	17	53	164	522	1,633	5,214	16,325	0
Small to moderate stream (10 to 100 cfs)	0	2	0.4	2	5	16	52	163	521	1,633	0
Moderate to large stream (> 100 to 1,000 cfs)	0	0	0.04	0.2	0.5	2	5	16	52	163	0
Large Stream to river (>1,000 to 10,000 cfs)	0	0	0.004	0.02	0.05	0.2	0.5	2	5	16	0
Large River (> 10,000 to 100,000 cfs)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Very Large River (>100,000 cfs)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Shallow ocean zone or Great Lake (depth < 20 feet)	0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	0
Moderate ocean zone or Great Lake (Depth 20 to 200 feet)	0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	0
Deep ocean zone or Great Lake (depth > 200 feet)	0	0	0	0	0	0.001	0.003	0.008	0.03	0.08	0
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	0	10	2	9	26	82	261	817	2,607	8,163	0

SI TABLE 9 (FROM HRS TABLE 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY[a] (Continued)

Type of Surface Water Body	Pop.	NUMBER OF PEOPLE					Pop. Value
		30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,001 to 3,000,000	3,000,001 to 10,000,000	
Minimal Stream (<10 cfs)	0	52,137	163,246	521,360	1,632,455	5,213,590	0
Small to moderate stream (10 to 100 cfs)	0	5,214	16,325	52,136	163,245	521,359	0
Moderate to large stream (> 100 to 1,000 cfs)	0	521	1,633	5,214	16,325	52,136	0
Large Stream to river (>1,000 to 10,000 cfs)	0	52	163	521	1,632	5,214	0
Large River (> 10,000 to 100,000 cfs)	0	5	16	52	163	521	0
Very Large River (>100,000 cfs)	0	0.5	2	5	16	52	0
Shallow ocean zone or Great Lake (depth < 20 feet)	0	5	16	52	163	521	0
Moderate ocean zone or Great Lake (Depth 20 to 200 feet)	0	0.5	2	5	16	52	0
Deep ocean zone or Great Lake (depth > 200 feet)	0	0.3	1	3	8	26	0
3-mile mixing zone in quiet flowing river (≥ 10 cfs)	0	26,068	81,623	260,680	816,227	2,606,795	0
						Sum =	0

[a] Round the number of people to nearest integer. Do not round the assigned dilution-weighted population value to nearest integer.

[b] Treat each lake as a separate type of water body and assign it a dilution-weighted population value using the surface water body type with the same dilution weight from HRS Table 4-13 as the lake. If drinking water is withdrawn from coastal tidal water or the ocean, assign a dilution-weighted population value to it using the surface water body type with the same dilution weight from HRS Table 4-13 as the coastal tidal water or the ocean zone.

SI TABLE 10: HUMAN FOOD CHAIN ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to µg/kg or ppb.
If sum of percents calculated for I or J index is ≥ 100%, consider the fishery a Level I target; if sum of I or J index is < 100 percent consider the fishery a Level II target. List only those substances that meet the observed release criteria in a fishery within the target distance limit and have a BCF of ≥ 500; BCF values are found on SI Table 7.

Fishery ID: Sample Type: Level I: Level II: References:

Sample ID	Hazardous Substance	Conc. (µg/kg)	Benchmark Conc. (FDAAL)	% of Benchmark	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.
North Bluff	Benzene	150 µg/L	NA	--	NA	--	NA	--
North Bluff	Toluene	28 µg/L	NA	--	NA	--	NA	--
North Bluff	Ethyl Benzene	54 µg/L	NA	--	NA	--	NA	--
North Bluff	Styrene	37 µg/L	NA	--	NA	--	NA	--
North Bluff	Xylene	320 µg/L	NA	--	NA	--	NA	--
			Highest Percent	--	Sum of Percents	--	Sum of Percents	--

Notes: To date no human food chain sampleing has been conducted. Samples listed aboveare seep samples collected fromthe property adjacent to the Black Wariior River.

SI TABLE 11: SENSITIVE ENVIRONMENT ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Notes: Convert all results and SCDM values to µg/L or ppb.
If the highest % of benchmark calculated is ≥ 100%, consider the sensitive env. a Level I target; if the highest % of benchmark calculated is < 100% consider the sensitive env. a Level II target.

Environment ID: Sample Type: Level I: Level II: Environment Value:

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (AWQC or AALAC)	% of Benchmark	References
North Bluff	Benzene	150 µg/L	NA	--	SI
North Bluff	Toluene	28 µg/L	NA	--	SI
North Bluff	Ethyle Benzene	54 µg/L	NA	--	SI
North Bluff	Styrene	37 µg/L	NA	--	SI
North Bluff	Xylene	320 µg/L	NA	--	SI
			Highest Percent	--	

SCDM Version: JUN96
Notes: To date no surface water samples have been collected from the surface water along the 15-mile downstream surface water pathway. Sample concentrationlisted above are seep samples collected along the banks of the Black Warrior River.

SURFACE WATER PATHWAY (Continued)
HUMAN FOOD CHAIN THREAT WORKSHEET

HUMAN FOOD CHAIN THREAT TARGETS	Score	Data Type	Refs
Record the water body type and flow for each fishery within the target distance limit. If there is no fishery within the target distance limit, assign a score of 0 at the bottom of this page.			
Fishery Name: Black Warrior River — Water Body: Black Warrioir River — Flow: 100 - 1,000 cfs Species: warm water species — Production: > 0 lbs/yr Species: — Production: lbs/yr Fishery Name: — Water Body: — Flow: cfs Species: — Production: lbs/yr Species: — Production: lbs/yr			
FOOD CHAIN INDIVIDUAL (Select highest value) 7. ACTUAL CONTAMINATION FISHERIES: Assign 50 points for a Level I fishery only if tissue samples document an observed release of a substance with a BCF ≥ 500 to a fishery within the target distance limit (SI Table 10). List substance(s):_____. Assign 45 points for a Level II fishery if surface water/sediment samples document an observed release of a substance with a BCF ≥ 500 to a fishery within the target distance limit (SI Table 10). List substance(s):_____.	45		
8. POTENTIAL CONTAMINATION FISHERIES: Assign 20 points for a potential fishery if there is an observed release of a substance with a BCF ≥ 500 (SI Table 7) to a watershed containing fisheries within the target distance limit, but no Level I or Level II fisheries are scored because there is no fishery documented between the PPE and the most downstream observed release sample point. If there is no observed release of a substance with a BCF ≥ 500 to a watershed, assign a value for potential contamination fisheries from the table below using the lowest flow of all fisheries within the target distance limit.			

Lowest Flow	FCI Value
<10 cfs	20
10 to 100 cfs	2
>100 cfs, coastal tidal waters, oceans, or Great Lakes	0
3-mile mixing zone in quiet flowing river	10

FCI Value =

Targets T = 45

Notes:

SURFACE WATER PATHWAY (Continued)
ENVIRONMENTAL THREAT WORKSHEET

When measuring length of wetlands that are located on both sides of a surface water body, sum both frontage lengths. For a sensitive environment that is more than one type, assign a value for each type.

ENVIRONMENTAL THREAT TARGETS	Score	Data Type	Refs

Record the water body and flow for each surface water sensitive environment within the target distance limit (see SI Table 12). If there is no sensitive environment within the target distance limit, assign a score of 0 at the bottom of the page.

Environment Type (SI Table 13)	Water Body Name	Flow
26 mile of wetlands frontage	Black Warrior River	100 - 1,000 cfs
Clean Water Act	Carthage Branch	< 10 cfs
9 Federally endangered/threatened species	Black Warrior River	100 - 1,000 cfs

9. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: If sampling data or direct observation indicate any sensitive environment has been exposed to a hazardous substance from the site, record this information on SI Table 11, and assign a factor value for the environment (SI Tables 13 and 14).

Substance(s): Benzene Toluene Ethylbenzene

From Table: 11 11 11

Environment Type (SI Table 13)	Environment Value (SI Tables 13 & 14)	Multiplier (10 for Level I, 1 for Level II)	Product
CWA	5	× 1 =	5
		× =	
		× =	
		× =	
		Sum =	5

10. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS:

Flow	Dilution weight (SI Table 12)	Environment Type and Value (SI Tables 13 & 14)	Pot. Cont.	Product
100 - 1,000 cfs	0.01 ×	26 miles of wetland frontage (500) ×	0.1 =	0.5
100 - 1,000 cfs	0.01 ×	9 endangered/threatened species (675) ×	0.1 =	0.675
cfs	×	×	0.1 =	
			Sum =	1.175

Sum of Targets T = 6.175

Notes:

SI TABLE 12 (HRS TABLE 4-13): SURFACE WATER DILUTION WEIGHTS

*	TYPE OF SURFACE WATER BODY		Assigned Dilution Weight
	Descriptor	**Flow Characteristics**	
	Minimal stream	< 10 cfs	1
	Small to moderate stream	10 to 100 cfs	0.1
	Moderate to large stream	> 100 to 1,000 cfs	0.01
	Large stream to river	> 1,000 to 10,000 cfs	0.001
	Large river	> 10,000 to 100,000 cfs	0.0001
	Very large river	> 100,000 cfs	0.00001
	Coastal tidal waters	Flow not applicable; depth not applicable	0.0001
	Shallow ocean zone or Great Lake	Flow not applicable; depth less than 20 feet	0.0001
	Moderate depth ocean zone or Great Lake	Flow not applicable; depth 20 to 200 feet	0.00001
	Deep ocean zone or Great Lake	Flow not applicable; depth greater than 200 feet	0.000005
	3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

* Check all (✓) appropriate dilution weights.

Notes:

SI TABLE 13 (HRS TABLE 4-23): SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES

*	Sensitive Environment	Assigned Value
	Critical habitat for Federal designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
✓	Habitat known to be used by Federal designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance of fish/shellfish species within a river system, bay, or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding National river reach designated as recreational	75
	Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
	State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
✓	State designated areas for the protection and maintenance of aquatic life under the Clean Water Act	5
	Wetlands See SI Table 14 (Surface Water Pathway) or SI Table 23 (Air Pathway)	

*Check (✓) all environments impacted or potentially impacted by the site.

SI TABLE 14 (HRS TABLE 4-24): SURFACE WATER WETLANDS FRONTAGE VALUES

*	TOTAL LENGTH OF WETLANDS	ASSIGNED VALUE
	Less than 0.1 mile	0
	0.1 to 1 mile	25
	Greater than 1 to 2 miles	50
	Greater than 2 to 3 miles	75
	Greater than 3 to 4 miles	100
	Greater than 4 to 8 miles	150
	Greater than 8 to 12 miles	250
	Greater than 12 to 16 miles	350
	Greater than 16 to 20 miles	450
✓	Greater than 20 miles	500

* Check (✓) highest value for each applicable flow characteristic.

Notes:

SURFACE WATER PATHWAY (Concluded)
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

WASTE CHARACTERISTICS — Score

11. If an Actual Contamination Target (drinking water, human food chain, or environmental threat) exists for the watershed, assign the calculated hazardous waste quantity score, or a score of 100, whichever is greater. If no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to surface water. — 10,000

12. Assign the highest value from SI Table 3 or SI Table 7 for the hazardous substance waste characterization factors below. Multiply each by the surface water hazardous waste quantity score and determine the waste characteristics score for each threat.

	DWT	HFCT	ET
Substance(s):	Benzene	Benzene	1,3,5-Trinethykbenzene
Value:	40	2E+05	5E+08
From Table:	3	3	3

*Footnote all substances which cannot fit on Table.

13. Multiply the toxicity and hazardous waste quantity scores. Assign the waste characteristics score for each threat from the table below.

Product	WC Score	DWT	HFCT	ET
0	0			
>0 to <10	1			
≥10 to <100	2			
≥100 to <1,000	3			
≥1,000 to <10,000	6			
≥10,000 to <1E+05	10			
≥1E+05 to <1E+06	18	✓		
≥1E+06 to <1E+07	32			
≥1E+07 to <1E+08	56			
≥1E+08 to <1E+09	100			
≥1E+09 to <1E+10	180		✓	
≥1E+10 to <1E+11	320			

	Substance Value		HWQ	Product	WC Score (from Table)	
Drinking Water Threat (DWT) Toxicity × Persistence	40	×	10,000 =	400,000	18	(Maximum of 100)
Food Chain Threat (HFCT) Toxicity × Persistence Bioaccumulation	2E+05	×	10,000 =	2E+09	180	(Maximum of 1000)
Environmental Threat (ET) Ecotoxicity × Persistence × Ecobioaccumulation	5E+08	×	10,000 =	5E+12	1,000	(Maximum of 1000)

SURFACE WATER PATHWAY THREAT SCORES

Threat (T)	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics(WC) Score (determined above)	Threat Score $\frac{LR \times T \times WC}{82,500}$	
Drinking Water (DW)	550	5	18	0.60	(Maximum of 100)
Human Food Chain (HFC)	550	45	180	54	(Maximum of 100)
Environmental (E)	550	6.175	1,000	41.17	(Maximum of 60)

Multiply LR by T and by WC. Divide the product by 82,500 for each threat (T). Sum the threat scores to obtain the surface water pathway score for each watershed/migration route. Select the highest watershed/migration route score. If the pathway score is greater than 100, assign 100.

SURFACE WATER PATHWAY CALCULATION:
(DWT + HFCT + ET) = 95.77

(Maximum of 100)

Notes: If surface water or sediment samples collected from the Black Warrior River indicated a release of substances similar to substances detected on the property the surface water pathway score would increase to approximately 89.

SOIL EXPOSURE PATHWAY

Pathway Description and Scoring Notes: Identify all areas of observed contamination. Indicate whether a resident population is associated with the site and characterize the area surrounding the site. Identify the nearby population and any terrestrial sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Soil Exposure Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Soil Exposure Pathway for this site, or any key factors which influenced your scoring rationale.

The Cracker property is underlain by Bama Series soils which were formed from loamy marine sediments of fine sandy loam, loam and sandy clay loam. Soils of this series are considered to be deep, well drained, and moderately permeable (ADEM 1996, pg. 11).

The Black Warrior River and associated wetlands restrict access to the Cracker property from both the east and northeast; however, pedestrian access to the property from the south and west is not restricted (USGS 1983; ADEM 1996, pg. 11).

Based on past investigations of the property approximately 20 people work on the Cracker property (ADEM 1996, pg. 12). The nearest residence to the Cracker property is located approximately 400 feet south (USGS 1983). Approximately 6 people (not including on-site workers) are located within 0.25-radial miles from the property and approximately 108 people are located within 1-radial mile of the property (Tetra Tech 2000). Moundville Elementary School is located approximately 7/8 of a mile to the southwest of the site. No know day care facilities are located within 0.5-radial miles of the property (ADEM 1996, pg. 12). No portion of the property is considered to be a wetland and no know threatened or endangered species are know to inhabit the property (USGS 1983).

Soil Samples Collected From Cracker Asphalt Property (1996)

Sample location	Substance	Concentration
East Tank Sample	Toluene	0.27 mg/kg
East Side Flow	1,2,3 Trimethylbenzene	0.33 mg/kg
East Side Flow	1,3,5 Trimethylbenzene	0.36 mg/kg
East Side Flow	Toluene	0.46 mg/kg
Skimmer Trench	Toluene	2.0 mg/kg
Lagoon 1	1,2,4 Trimethylbenzene	1.7 mg/kg
Lagoon 1	1,3,5 Trimethylbenzene	0.18 mg/kg
Lagoon 1	Ethylbenzene	0.23 mg/kg
Lagoon 1	Isopropylbenzene	0.17 mg/kg

Lagoon 1	Naphthalene	48.3 mg/kg
Lagoon 1	n-Propylbenzene	0.81 mg/kg

Surface soil samples collected from the property have indicated an observed release to the soil exposure pathway. Potential targets of contaminant migration from the site via the soil exposure and/or the air migration pathways include the on-site worker population, and sensitive species and wetlands. No known migration of site contaminants has occurred from the property via the soil or air migration pathways and it is unlikely that any of the potential receptors in the vicinity of the site have been impacted.

SI TABLE 15a: SOIL EXPOSURE OBSERVED CONTAMINATION SUBSTANCES

Source ID:

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Toxicity	References
Skimmer trench	Toluene	2.0 mg/kg	--	--	10	SI
East side flow	1,2,3 Trimethylbenzene	0.33 mg/kg	--	--		SI
East side flow	1,3,5 Trimethylbenzene	0.36 mg/kg	--	--	NL	SI
Lagoon 1	1,2,4 Trimethylbenzene	1.7 mg/kg	--	--	100	SI
Lagoon 1	Ethylbenzene	0.23 mg/kg	--	--	10	SI
Lagoon 1	Isopropylbenzene	0.17 mg/kg	--	--		SI
Lagoon 1	Napthalene	48.3 mg/kg	--	--	100	SI
Lagon 1	n-Propylbenzene	0.81 mg/kg	--	--	NL	SI
				Highest Toxicity	100	

Notes:

SI TABLE 15b: SOIL EXPOSURE RESIDENT POPULATION TARGETS

Notes: Convert all results and SCDM values to µg/kg or ppb. If sum of percent calculated for I or J index is ≥ 100%, consider residents Level I targets; if sum of I or J index is < 100%, consider the residents Level II targets.

Residence ID: Level I: Level II: Population:

Sample ID	Hazardous Substance	Conc. (µg/kg)	RfD (J index)	% of RfD	Cancer Risk Conc. (I index)	% of Cancer Risk Conc.	References
		x	x	x	x	x	
		x	x	x	x	x	
		x	x	x	x	x	
		x	x	x	x	x	
			Sum of Percents	x	Sum of Percents	x	

SCDM Version: JUN96
Notes:

SOIL EXPOSURE PATHWAY WORKSHEET
RESIDENT POPULATION THREAT

LIKELIHOOD OF EXPOSURE	Score	Data Type	Refs
1. OBSERVED CONTAMINATION: If evidence indicates presence of observed contamination (depth of 2 feet or less), assign a score of 550; otherwise, assign a 0. Note that a likelihood of exposure score of 0 results in a soil exposure pathway score of 0.	550	+	SI
LE=	550		

TARGETS

2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on contaminated property and within 200 feet of areas of observed contamination (HRS section 5.1.3). Level I: ___ people × 10 = ___ Level II: ___ people × 1 = ___ **Sum=**	0		
3. RESIDENT INDIVIDUAL: Assign a score of 50 if any Level I resident population exists. Assign a score of 45 if there are Level II targets but no Level I targets. If no resident population exists (i.e., no Level I or Level II targets), assign 0 (HRS Section 5.1.3).	0		
4. WORKERS: Assign a score from the table below for the total number of workers at the site and nearby facilities and within areas of observed contamination associated with the site.	5	+	SI

Number of Workers	Score
0	0
1 to 100	5
101 to 1,000	10
>1,000	15

5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value for each terrestrial sensitive environment (SI Table 16) in an area of observed contamination.			

Terrestrial Sensitive Environment Type	Value
Sum =	0

6. RESOURCES: Assign a score of 5 if any one or more of the following resources is present on area of observed contamination at the site; assign 0 if none applies. • Commercial agriculture • Commercial silviculture • Commercial livestock production or commercial livestock grazing	0		
Sum of Targets T=	5		

Notes:

SOIL EXPOSURE PATHWAY WORKSHEET
NEARBY POPULATION THREAT

LIKELIHOOD OF EXPOSURE		Score	Data Type	Ref.
7. Attractiveness/Accessibility (from SI Table 17 or HRS Table 5-6)	Value: 10		+	SI
Area of Contamination (from SI Table 18 or HRS Table 5-7)	Value: 5		-	
	Likelihood of Exposure (from SI Table 19 or HRS Table 5-8)			
	LE=	5		

TARGETS	Score	Data Type	Ref.
8. Assign a score of 0 if Level I or Level II resident individual has been evaluated or if no individuals live within 1/4 mile travel distance of an area of observed contamination. Assign a score of 1 if nearby population is within 1/4 mile travel distance and no Level I or Level II resident population has been evaluated.	1	+	Topo Map
9. Determine the population within 1 mile travel distance that is not exposed to a hazardous substance from the site (i.e., properties that are not determined to be Level I or Level II); record the population for each distance category in SI Table 20 (HRS Table 5-10). Sum the population values and multiply by 0.1.	0.6	+	Population Calculation
Sum of Targets T=	1.6		

Notes:

SI TABLE 16 (HRS TABLE 5-5): SOIL EXPOSURE PATHWAY
TERRESTRIAL SENSITIVE ENVIRONMENT VALUES

*	TERRESTRIAL SENSITIVE ENVIRONMENT	ASSIGNED VALUE
	Terrestrial critical habitat for Federal designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
	Terrestrial habitat known to be used by Federal designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
	Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federal designated endangered or threatened status	50
	State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

* - Check (✓) all environments impacted or potentially impacted by the site.

Notes:

SI TABLE 17 (HRS TABLE 5-6); ATTRACTIVENESS/ACCESSIBILITY VALUES

*	AREA OF OBSERVED CONTAMINATION	ASSIGNED VALUE
	Designated recreational area	100
	Regularly used for public recreation (for example, vacant lots in urban area)	75
	Accessible and unique recreational area (for example, vacant lots in urban area)	75
	Moderately accessible (may have some access improvements-for example, gravel road) with some public recreation use	50
	Slightly accessible (for example, extremely rural area with no road improvement) with some public recreation use	25
✓	Accessible with no public recreation use	10
	Surrounded by maintained fence or combination of maintained fence and natural barriers	5
	Physically inaccessible to public, with no evidence of public recreation use	0

* Check (✓) highest value.

SI TABLE 18 (HRS TABLE 5-7): AREA OF CONTAMINATION FACTOR VALUES

*	TOTAL AREA OF THE AREAS OF OBSERVED CONTAMINATION (SQUARE FEET)	ASSIGNED VALUE
*	≤ to 5,000	5
	> 5,000 to 125,000	20
	> 125,000 to 250,000	40
	> 250,000 to 375,000	60
	> 375,000 to 500,000	80
	> 500,000	100

* Check (✓) highest value.

Notes: Available file information does not indicate the location of the soil samples collected from the property during past investigations. For the purposes of this evaluation <5,000 square foot area of contamination has been assumed.

SI TABLE 19 (HRS TABLE 5-8):NEARBY POPULATION LIKELIHOOD OF EXPOSURE FACTOR VALUES

Area of Contamination Factor Value	Attractiveness/Accessibility Factor Value						
	100	**75**	**50**	**25**	**10**	**5**	**0**
100	500	500	375	250	125	50	0
80	500	375	250	125	50	25	0
60	375	250	125	50	25	5	0
40	250	125	50	25	5	5	0
20	125	50	25	5	5	5	0
5	50	25	5	5	5	5	0

SI TABLE 20 (HRS TABLE 5-10): DISTANCE-WEIGHTED POPULATION VALUES FOR NEARBY POPULATION THREAT

Travel Distance Category (miles)	Pop.	NUMBER OF PEOPLE WITHIN THE TRAVEL DISTANCE CATEGORY												Pop. Value
		0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,001	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	
Greater than 0 to 1/4	6	0	0.1	0.4	1.0	4	13	41	130	408	1,303	4,081	13,034	0.1
Greater than 1/4 to ½	25	0	0.05	0.2	0.7	2	7	20	65	204	652	2,041	6,517	0.2
Greater than ½ to 1	77	0	0.02	0.1	0.3	1	3	10	33	102	326	1,020	3,258	0.3
													Sum =	0.6

References:

SOIL EXPOSURE PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS		Score
10.	Assign the hazardous waste quantity score calculated for soil exposure	10,000
11.	Assign the highest toxicity value from SI Table 15a. Substance(s): Benzene / Naphthalene / 1,2,4 Trimethylbenzene Value: 100 / 100 / 100 From Table: 15a / 15a / 15a	
12.	Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below:	

Product	WC Score	*
0	0	
>0 to <10	1	
≥10 to <100	2	
≥100 to <1,000	3	
≥1,000 to <10,000	6	
≥10,000 to <1E+05	10	
≥1E+05 to <1E+06	18	
≥1E+06 to <1E+07	32	✓
≥1E+07 to <1E+08	56	
≥1E+08 or greater	100	

WC = 32

RESIDENT POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 1;
Targets = Sum of Questions 2, 3, 4, 5, 6)

$\frac{550 \times 5 \times 32}{82{,}500}$ = 1.07

NEARBY POPULATION THREAT SCORE:

(Likelihood of Exposure, Question 7;
Targets = Sum of Questions 8,9)

$\frac{550 \times 6.6 \times 32}{82{,}500}$ = 1.408

SOIL EXPOSURE PATHWAY CALCULATION:
Resident Population Threat + Nearby Population Threat = 2.478

(Maximum of 100)

Notes:

AIR MIGRATION PATHWAY

Pathway Description and Scoring Notes: Describe the Air Migration Pathway. Identify the nearest potential receptors of airborne contaminants and the population residing within four miles of the site. Identify any sensitive environments located within the target distance limit.

Briefly discuss any sampling events relative to the Air Pathway; provide dates of sampling events and a summary of the analytical results and whether an observed release and/or actual contamination targets were documented.

Indicate any assumptions you have made in scoring the Air Pathway for this site, or any key factors which influenced your scoring rationale.

The nearest residence to the Cracker property is located approximately 400 feet south of the site (ADEM, pg. 12; USGS 1983). According to the U.S. Department of Commerce, Land View III Environmental Mapping Software, which is based on the Bureau of Census 1990 population data, the total population located within 4-radial miles of the property is as follows: 0 to 0.25-radial miles, 6 people; 0.25 to 0.5-radial miles, 25 people; 0.5 to 1-radial mile, 77 people; 1 to 2-radial miles, 306 people; 2 to 3-radial miles, 689 people; 3 to 4-radial miles, 1,218 people (Tetra Tech 2000).

Estimated Population Within 4-Radial Miles of Cracker Asphalt

Radial Distance From Cracker Asphalt (miles)	Estimated Population
On a source	20
0.00 < 0.25	6
0.25 < 0.50	25
0.50 < 1.00	77
1.00 < 2.00	306
2.00 < 3.00	689
3.00 < 4.00	1,218
TOTAL	2,341

Based on published data from U.S Fish and Wildlife there are 10 threatened or endangered species known to inhabit portions of Hale and Tuscalossa Counties and potentially occurring within 4-radial miles of the site (USFWS 1992). Based on USGS topographic maps approximately 9 acres of wetlands are located with 0.25-radial miles of the site, 370 acres within 1-radial mile of the site, and approximately 1,900 acres of wetlands are located within 4-radial miles of the site (USGS 1983).

No laboratory qualitative air samples are known to have been collected from the Cracker property. Based on the available data, no release of hazardous substances to the ambient air from on-site sources is known or suspected to have occurred, and no impacts to nearby residential populations or sensitive environments are known or suspected.

SI TABLE 21a: AIR PATHWAY OBSERVED RELEASE SUBSTANCES

Note: Mobility equals 1 for all observed release substances

Sample ID	Hazardous Substance	Substance Concentration	Bckgrd. ID.	Bckgrd. Conc.	Gaseous or Particulate	Tox. x Mob. = Tox.	References
					Highest Value		

Notes: No air pathway samples have been collected from the property.

SI TABLE 21b: AIR PATHWAY ACTUAL CONTAMINATION TARGETS

Note: Convert all results and SCDM values to $\mu g/m^3$ or ppb.
If sum of percents calculated for I or J index is ≥ 100%, consider the targets as Level I; if the sum of I or J index is < 100% consider the targets as Level II.

Sample ID: Level I: Level II: Distance from Sources (mi): References:

Hazardous Substance	Conc. ($\mu g/m^3$)	Toxicity/ Mobility	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	RfD (I index)	% of RfD	Cancer Risk Conc. (J index)	% of Cancer Risk Conc.
	Highest Tox. x Mobility		Highest Percent		Sum of Percents		Sum of Percents	

AIR PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation support a release to air, assign a score of 550. Record observed release substances on SI Table 21.			
2. POTENTIAL TO RELEASE: If sampling data do not support a release to the air, assign a score of 500. Optionally, evaluate air migration gaseous and particulate potential to release (HRS Section 6.1.2).	500	-	
LR =	500		

TARGETS	Score	Data Type	Refs
3. ACTUAL CONTAMINATION POPULATION: Determine the number of people within the target distance limit subject to exposure from a release of a hazardous substance to the air. Level I: ___ people × 10 = ___ Level II: ___ people × 1 = ___ **Total =**	0		
4. POTENTIAL TARGET POPULATION: Determine the number of people within the target distance limit not subject to exposure from a release of a hazardous substance to the air using SI Table 22. Sum the values and multiply by 0.1.	2.58	+	
5. NEAREST INDIVIDUAL: Assign a score of 50 if there are any Level I targets. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Population exists, assign the Nearest Individual score from SI Table 22.	20	+	
6. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (SI Table 13) and wetland acreage values (SI Table 23) for environments subject to exposure from the release of a hazardous substance to the air.			
7. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS: Use SI Table 24 to evaluate sensitive environments not subject to exposure from a release.	3.225		
8. RESOURCES: Assign a score of 5 if one or more air resources applies within ½ mile of a source; assign a 0 if none applies • Commercial agriculture • Commercial silviculture • Major or designated recreation area			
Sum of Targets T =	25.805		

Sensitive Environment Type	Value
Wetland Acreage	**Value**

Notes:

AIR PATHWAY WORKSHEET (Concluded)

WASTE CHARACTERISTICS			Score
9. *If any Actual Contamination Targets exist for the air pathway, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if there are no Actual Contamination Targets for the air pathway, assign the calculated HWQ score for sources available for air migration.*			10,000
10. Assign the highest air toxicity × mobility value from SI Table 21a or SI Table 3.			
Substance(s):	Benzene	1,2,4- Trimethylbenzene	
Value:	100	100	
From Table:	3	3	

11. Multiply the toxicity and hazardous waste quantity scores. Assign the Waste Characteristics score from the table below:

Product	WC Score	*
0	0	
>0 to <10	1	
≥10 to <100	2	
≥100 to <1,000	3	
≥1,000 to <10,000	6	
≥10,000 to <1E+05	10	
≥1E+05 to <1E+06	18	
≥1E+06 to <1E+07	32	✓
≥1E+07 to <1E+08	56	
≥1E+08 or greater	100	

WC = 32

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the air migration pathway score.
If the pathway score is greater than 100, assign 100.

AIR MIGRATION PATHWAY CALCULATION: $\frac{500 \times 3.225 \times 32}{82,500} =$ 5.00

(Maximum of 100)

Notes:

SI TABLE 22 (FROM HRS TABLE 6-17): VALUES FOR POTENTIAL CONTAMINATION AIR TARGET POPULATIONS

Distance From Site	Pop.	Nearest Individual (choose highest)	NUMBER OF PEOPLE WITHIN THE DISTANCE CATEGORY												Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,000 to 3,000,000	
On a source	20	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	17
0 to 1/4 mile	6	20	1	4	13	41	131	408	1,304	4,081	13,034	40,812	130,340	408,114	1
> 1/4 to ½ mile	25	2	0.2	0.9	3	9	28	88	282	882	2,815	8,815	28,153	88,153	0.9
> ½ to 1 mile	77	1	0.06	0.3	0.9	3	8	26	83	261	834	2,612	8,342	26,119	0.9
> 1 to 2 miles	306	0	0.02	0.09	0.3	0.8	3	8	27	83	266	833	2,659	8,326	3
> 2 to 3 miles	689	0	0.009	0.04	0.1	0.4	1	4	12	38	120	375	1,199	3,755	1
> 3 to 4 miles	1,218	0	0.005	0.02	0.07	0.2	0.7	2	7	28	73	229	730	2,285	2
Nearest Individual =		20												**Sum =**	25.8

*Score = 20 if the Nearest Individual is within 1/8 mile of a source; score = 7 if the Nearest Individual is between 1/8 and 1/4 mile of a source.

References:
Notes:

SI TABLE 23 (HRS TABLE 6-18): AIR PATHWAY VALUES FOR WETLAND AREA

*	WETLAND AREA	ASSIGNED VALUE
	< 1 acre	0
	1 to 50 acres	25
	> 50 to 100 acres	75
	> 100 to 150 acres	125
	> 150 to 200 acres	175
	> 200 to 300 acres	250
	> 300 to 400 acres	350
	> 400 to 500 acres	450
	> 500 acres	500

* Check (✓) highest value.

SI TABLE 24: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS

DISTANCE	DISTANCE WEIGHT	SENSITIVE ENVIRONMENT TYPE AND VALUE (FROM SI TABLES 13 AND 23)	PRODUCT
On a Source	0.10	×	
		×	
0 to 1/4 mile	0.025	× 9 acres wetlands (25)	0.625
		×	
		×	
1/4 to ½ mile	0.0054	× 80 acres wetlands (75)	0.405
		×	
		×	
½ to 1 mile	0.0016	× 281acres wetlands (350)	0.56
		×10 Threatened/endangered species (750)	1.2
		×	
1 to 2 miles	0.0005	× >500 acres wetlands (500)	0.25
		×	
		×	
2 to 3 miles	0.00023	× >500 acres wetlands (500)	0.115
		×	
		×	
3 to 4 miles	0.00014	× >500 acres wetlands (500)	0.07
		×	
		×	
> 4 miles	0	×	
		Total Environments Score =	3.225

Notes: For the purposes of this investigation all threatened and/or endangered species have been assumed to exist between 0.5 and 1.0-radial mile of the site. This assumption is due to the lack of information concerning the location of the species in relation to the Cracker site.

SITE SCORE CALCULATION	S	S^2
GROUNDWATER PATHWAY SCORE (S_{GW})	34.41	1184.0481
SURFACE WATER PATHWAY SCORE (S_{SW})	95.77	9171.8929
SOIL EXPOSURE PATHWAY SCORE(S_{SE})	2.478	6.140484
AIR PATHWAY SCORE (S_A)	5.00	25.0
SITE SCORE $\sqrt{\frac{S_{GW}^2 + S_{SW}^2 + S_{SE}^2 + S_A^2}{4}} =$		50.96

COMMENTS:

WARNING!!
EPA has determined that the HRS score of any site that is progressing towards listing on the NPL is confidential. Deliberations regarding scoring or listing issues, the site specific status, and HRS scores cannot be released or discussed with non-Agency persons. For additional guidance see the April 30, 1993 OSWER Directive 9320.1-11.